CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL

Dissertation submitted in partial fulfillment of

M.D. DEGREE EXAMINATION

M.D. PEDIATRICS, BRANCH-VII CHENGALPATTU

MEDICAL COLLEGE AND HOSPITAL CHENGALPATTU

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

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MAY 2018

DECLARATION

I **Dr. R. NISHA** have proposed study titled **"CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL"** in Department of Paediatrics at Chengalpattu Medical College and Hospital, I hereby ensure that I will abide by the rules of the institutional ethics committee.

A PROSPECTIVE STUDY

A bonafide work done by me in the Department of Paediatrics, Chengalpattu Medical College, Chengalpattu, under the guidance of Prof. **Dr. J. SATHYA M.D., D.C.H.,** Head of the department, Department of Paediatrics, Chengalpattu Medical College, Chengalpattu.

(Dr. R. NISHA)

Signature of the candidate

CERTIFICATE

This is to certify that the dissertation titled **"CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL"** is

The bonafide work of **Dr. R. NISHA** in partial fulfillment of the requirements for **M.D. BRANCH-VII (PEDIATRICS)** examinations of **THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY** to be held in 2018.the period of study was from August 2016- September 2017.

Signature of the H.O.D

Professor and Head
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CERTIFICATE BY THE GUIDE

This is to certify that the dissertation titled **"CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL"** submitted by **Dr. R. NISHA,** in partial fulfillment for the award of the degree of DOCTOR OF MEDICINE IN PEDIATRICS by The Tamilnadu Dr.M.G.R Medical University, Chennai is bonafide work done by him in the Department of Pediatrics, CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU, during the academic year 2016-2017 under my guidance.

PLACE: Chengalpattu

DATE:

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INSTITUTIONAL ETHI AL COMMITTEE

CHENGALPATTU MEDICAL CO LEGE, CHENGALPATTU

Title of Work	:	**Clinical Profile and Outcome of Shock Among Children In A Tertiary Care Hospital PICU**
Principal Investigator	:	Dr.R. Nisha, MD.,
Designation	:	Post Graduate in Pediatrics,
Co-Investigators	:	1.Dr. Sathya, MD.DCH., Professor of Pediatrics,
Department	:	Pediatrics.

The request for an approval From the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 25.10.2016 at the Medical Education Unit, Government Chengalpattu Medical College, Chengalpattu at 12.00 PM.

The Members of the committee, the Secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal Investigator and their team are directed to adhere to the guidelines given below:

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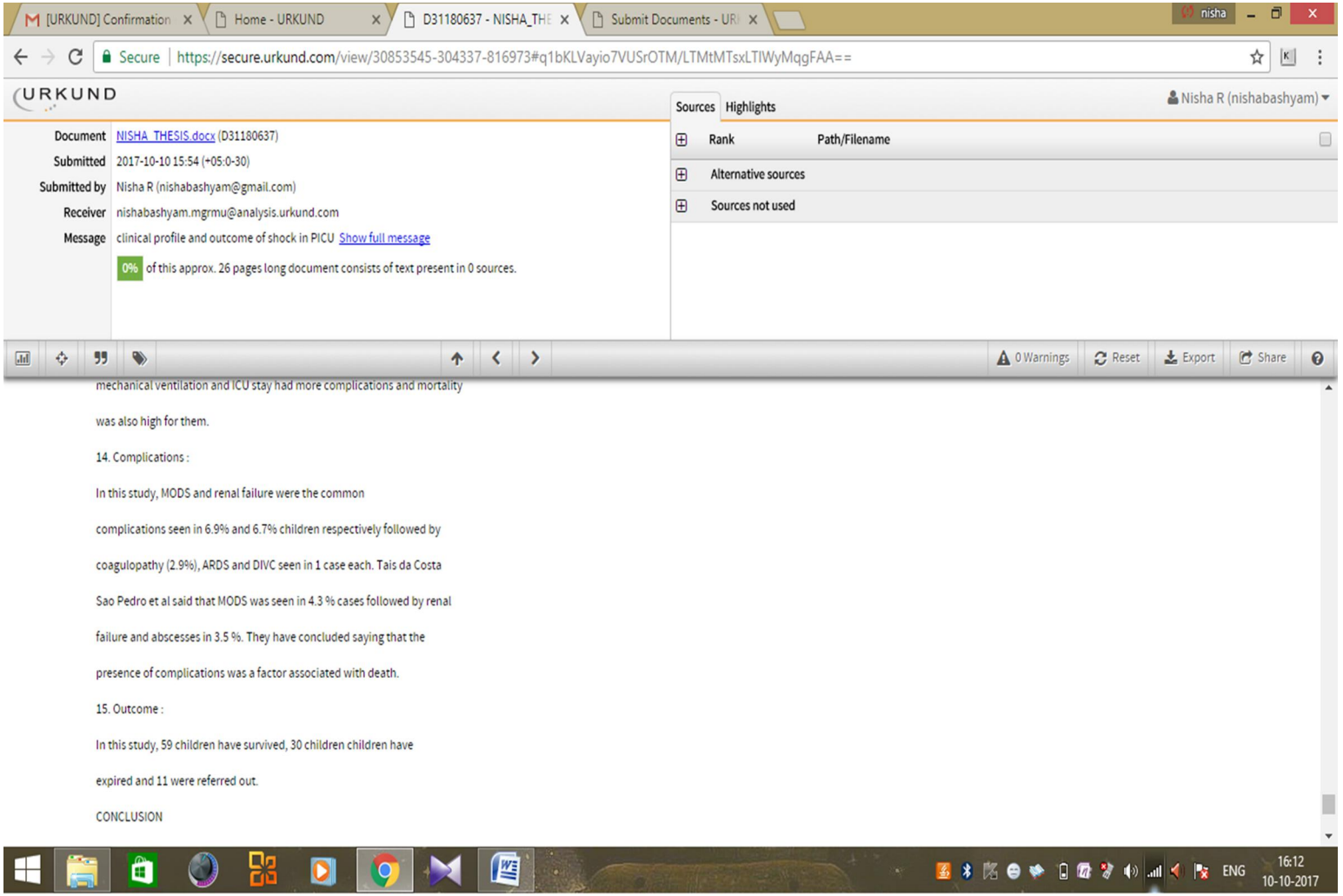
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mechanical ventilation and ICU stay had more complications and mortality
was also high for them.
14. Complications :
In this study, MODS and renal failure were the common
complications seen in 6.9% and 6.7% children respectively followed by
coagulopathy (2.9%), ARDS and DIVC seen in 1 case each. Tais da Costa
Sao Pedro et al said that MODS was seen in 4.3 % cases followed by renal
failure and abscesses in 3.5 %. They have concluded saying that the
presence of complications was a factor associated with death.
15. Outcome :
In this study, 59 children have survived, 30 children children have
expired and 11 were referred out.
CONCLUSION
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ABBREVIATIONS

SIRS	-	SYSTEMIC INFLAMMATORY RESPONSE SYNDROME
ARDS	-	ACUTE RESPIRATORY DISTRESS SYNDROME
SOFA	-	SEQUENTIAL ORGAN FAILURE ASSESSEMENT
TNF	-	TUMOUR NECROSIS FACTOR
JVP	-	JUGULAR VENOUS PRESSURE
BMT	-	BONE MARROW TRANSPLANT
MAP	-	MEAN ARTERIAL PRESSURE
PEEP	-	POSITIVE END EXPIRATORY PRESSURE
MODS	-	MULTI ORGAN DYSFUNCTION SYNDROME
GCS	-	GLASGOW COMA SCALE
PRISM SCORE	-	PEDIATRIC RISK OF MORTALITY SCORE
PALS	-	PEDIATRIC ADVANNCED LIFE SUPPORT
ACCM	-	AMERICAN COLLEGE OF CRITICAL CARE MEDICINE

INTRODUCTION

Shock is an acute state in which the metabolic demands of the body tissues and organs are not met due to inadequate oxygen supply[1]. It is a major cause of morbidity and mortality. In developed countries like US, 37% of children in emergency department would be in shock. Of these shock cases, majority would be due to sepsis (57%), then hypovolemia (24%), distributive (14%) and cardiogenic (5%)[2]. During shock, body tries to compensate for the hypoxic state by attempting to preserve the oxygenation of vital organs like brain, heart, liver and kidney at the cost of other organs like muscles, GIT and skin.

DEFINITION

Definition at the cellular level is a state of inadequate substrate for aerobic cellular respiration as the cardiopulmonary system is unable to supply adequate oxygen and glucose for the synthesis of ATP by mitochondria[1,11].

TYPES OF SHOCK[3]

1. Hypovolemic : The most common type of shock in paediatrics. Common causes includes diarrhoea, vomiting or hemorrhage, dengue shock, polyuria like in DKA and sepsis. It is due to loss of intravascular volume.

2. Cardiogenic shock: It is due to the failure of the heart to pump the blood resulting in global hypoperfusion. Common causes include congenital heart disease, cardiomyopathies, arrhythmias and toxins.

3. Obstructive shock: It is due to any mechanical barrier that impairs adequate cardiac output. Causes include pericardial tamponade, pulmonary embolism, tension pneumothorax.

4. Distributive shock: It is due to inadequate vasomotor tone, increased capillay leak and loss of fluid into the interstitium. Examples include anaphylaxis, sepsis, neurological injury (spinal shock).

5. Septic shock: It is usually due to a complex interaction between distributive, hypovolemic and cardiogenic shock. Systemic Inflammatory response syndrome (SIRS) is characterised by tachycardia, tachypnoea and hyper/hypothermia or high leukocyte count. Sepsis is defined as SIRS in the presence of an infection either proven or suspected. Septic shock is defined as the circulatory failure occurring in the setting of sepsis

STAGES OF SHOCK[4]

Early compensated shock:

In the early stages of shock, due to the compensatory mechanisms, there is release of catecholamines which causes the increase in heart rate and systemic vascular resistance (SVR). As a result, children will be able to maintain the vessel tone and blood pressure in low flow states of septic and cardiogenic shocks.

But if left untreated, they will progress on to the decompensated stage. Children depend upon tachycardia to increase the cardiac output unlike adults where cardiac contractility increases due to the release of catecholamines. This is due to the fact that children lack both muscle mass and stiffness in their myocardium.

Decompensated shock:

When the compensatory mechanisms fail, the blood pressure will not be maintained. Hence the metabolic demands of the tissues will not be met. So the Tissue hypoxia triggers the anaerobic metabolism resulting in lactic acid formation. The vasoactive metabolites namely nitric oxide and adenosine gets accumulated locally resulting in leaky capillaries. Derangement of hemostasis occurs leading to microvascular thrombosis. As a result there will be multi organ hypoperfusion which leads to clinical shock with hypotension.

Irreversible (refractory shock):

If the hypoperfusion persists, the child will progress to a state of reversible shock where there is complete failure of an organ that will not recover despite interventions.

Pathophysiology of shock [5,14,15,16]:

The compensatory mechanisms of shock occurs in each system like cardiovascular system, respiratory system and renal system. With regard to cardiovascular system, compensation occurs by increasing the heart rate, stroke volume and the tone of smooth muscles. The respiratory system, to compensate for the metabolic acidosis, exhales more amount of carbon dioxide. The renal system also excretes more amount of hydrogen ions and retains bicarbonate ions to normalise the body pH.

Hypovolemic shock is characterised by loss of fluid and a reduction in the preload. The increase in the heart rate and the systemic vascular resistance are the primary compensatory mechanisms in this type of shock.

In distributive shock, there is an abnormal vasodilation leading to reduced systemic vascular resistance(SVR). Because of the lowered SVR, there is distribution of blood away from the vital organs. So there is an increase in the cardiac output as a compensation. So there is reduction in both preload and afterload.

In cardiogenic shock, contraction of the heart is affected. This leads to systolic and diastolic dysfunctioning.

In septic shock, there is usually a combination of distributive, hypovolemic and cardiogenic shock. Cardiogenic shock is due to the depressant effect of sepsis over the myocardium. Distributive shock is due to reduction in the systemic vascular resistance. Hypovolemia is due to decreased intravascular volume as a result of capillary leak.

Systemic Inflammatory response syndrome(SIRS):

SIRS is an inflammatory response by the host to any trigger which can be either infectious or non infectious. This inflammatory cascade results in various other complications like hypovolemia, ARDS, insulin insensitivity, cardiac failure, coagulation abnormalities and uncontrolled secondary infections. TNF and certain other inflammatory mediators will increase the vascular permeability, causing capillary leak and an impaired balance between the perfusion and the metabolic demands of the tissues. Interleukin-1 and TNF stimulates the release of proinflammatory and antinflammatory mediators that causes fever and dilation of blood vessels.[7]

Proinflammatory mediators: IL-6, IL-12, IFN-gamma

Anti-inflammatory mediatos: IL-10, IL-14 and TGF-beta

Arachidonic acid metabolite: responsible for tachypnea, fever, lactic acidosis & ventilation-perfusion abnormalities

The pathogenesis of shock is explained in the figure 1.

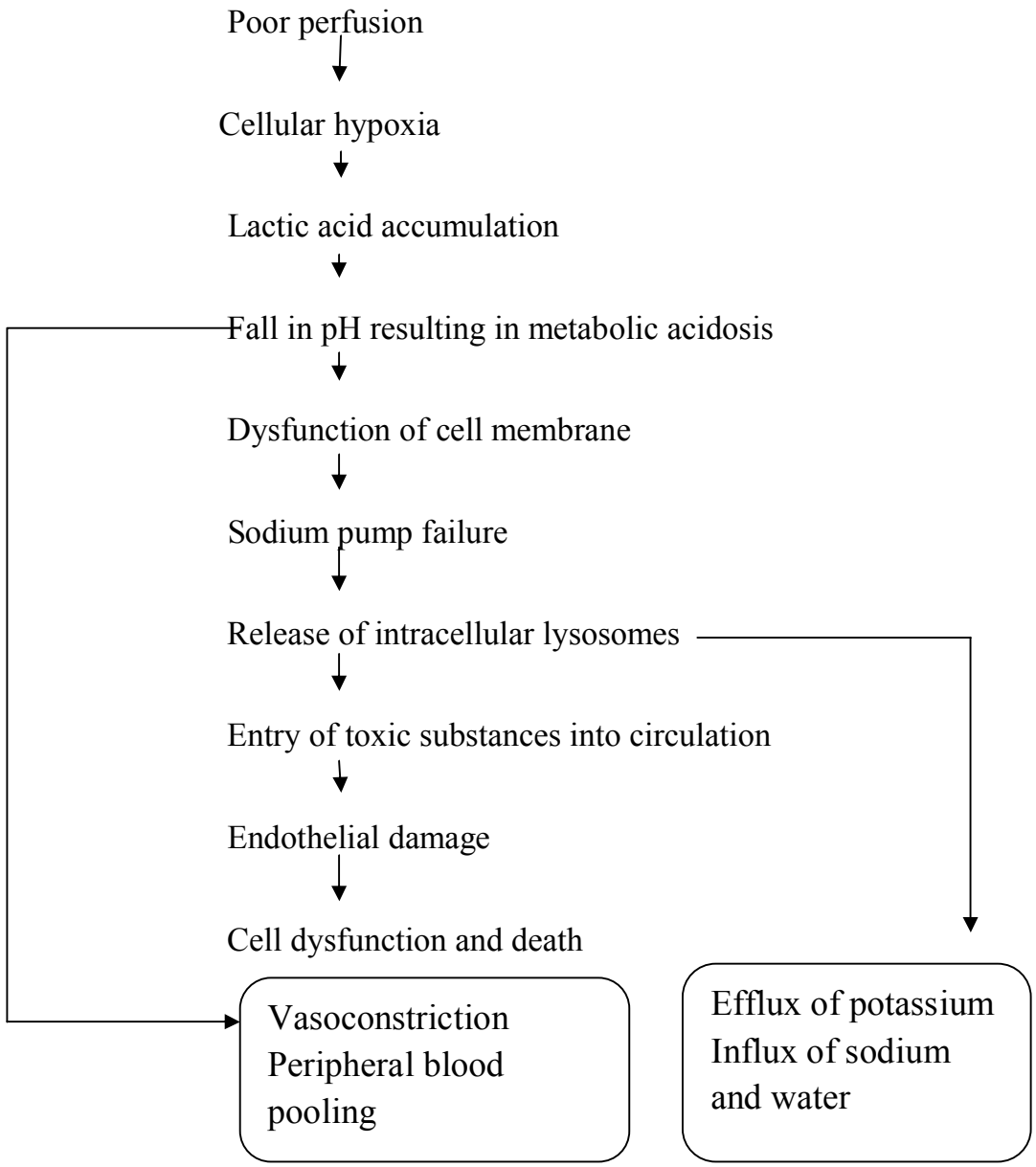

Figure 1: Pathogenesis of shock

Table 1: Identification of shock

Signs of impaired perfusion			
Organ system	**↓ Perfusion**	**↓↓ Perfusion**	**↓↓↓ Perfusion**
CNS	--	Restless, anxious	Agitated/confused ,coma
RS	--	Ventilation	Ventilation
Metabolism	--	Compensated metabolic acidosis	Uncompensated metabolic acidosis
GIT	--	Motility	Ileus
Renal	Reduced Urine output	Reduced Urine output (<0.5mL/kg/hr)	Oliguria/anuria
Skin	Prolonged CRT	Cool peripheries	Mottled, cyanotic, cold extremities
CVS	Heart rate	Tachycardia	Heart rate
		Weak peripheral pulses	Blood pressure, central pulses only

Clinical manifestation[8]:

Hypovolemic shock: Tachycardia, weak pulse, sunken eyes, sunken fontanelles, oliguria and a prolonged capillary refill time. Stages of hypovolemic shock is shown in the table 2

Table 2: Stages of hypovolemic shock

Stages of hypovolemic shock			
Stage	**% blood volume loss**	**BP**	**Capillary refill**
1	Up to 15	Maintained Normal	Normal
2	15-25	Systolic maintained, diastolic is raised, pulse pressure reduced	Prolonged
3	25-40	Systolic decreases	Prolonged
4	>40	Systolic significantly reduced	Absent

Cardiogenic shock [12,13] : tachyarrhythmias, weak or absent pulse, hepatomegaly and a raised JVP

Distributive shock : Respiratory distress, angioedema, stridor, wheezing, early hypotension and a weak rapid pulse.

Septic shock (warm): Tachycardia, bounding pulses, wide pulse pressure, warm extremities, hypotension, altered sensorium.[17]

Septic shock (cold) : Cold extremities, poor peripheral perfusion, tachycardia, altered sensorium and diminished pulses.

Obstructive shock : Tachycardia, hypotension, deviation of mediastinum to opposite side in case of pneumothorax, distended JVP, pulsus paradoxus in case of tamponade.

Certain definitions in pediatric sepsis according to third international cocnsensus definitions foe for sepsis and septic shock:

SIRS [12,24]:

Two or more of the following:

1. Core temperature of more than 38.5^0C or less than 36^0C
2. Tachycardia with a heart rate of > 90/min
3. Respiratory rate of > 20 /min or Paco2 < 32 mm/hg
4. Elevated WBC count of > 12000 cells/cu.mm or <4000 cells/cu.mm or more than 10% immature bands

Infection : Suspected or proven infection or a clinical syndrome associated with high probability of infection.

Sepsis : Life threatening organ dysfunctioning caused by a dysregulated host response to infection.

Septic shock: It is a subset of sepsis in which underlying circulatory and cellular / metabolic abnormalities are profound enough to substantially increase morality[18].

Mortality in septic shock can be predicted to be >40% if there is persisting hypotension requiring vasopressors to maintain MAP $\geq$ 65 mm/Hg and having a serum lactate of >2 mmol/l (18 mg/dl) despite volume resuscitation.[9]

Risk of prolonged ICU stay can be promptly identified at the bed side with the use of qSOFA score which is explained below.

Organ dysfunctioning can be identified as an acute change in total SOFA score of $\geq$ 2 points consequent to the infection.

Sequential Organ Failure Assessment Score (SOFA) : It includes the following parameters :

- PaO2/FiO2 (mmHg)
- Platelet count ($\times 10^3$ / μl)
- Bilirubin (mg/dl)
- MAP and inotrope requirement with regard to CVS
- Glasgow Coma scale
- Serum creatinine (mg/dl) and Urine output with regard to renal system

Quick SOFA (qSOFA)[24] : It includes the parameters like respiratory rate of $\geq$ 22 / min, altered mentation and systolic blood pressure $\leq$ 100 mm Hg

Severe sepsis: Sepsis plus one of the following:

1. Cardiovascular dysfunction in the form of hypotension < 5th percentile or SBP < 2SD or a need for inotrope despite >40 ml/kg isotonic IV fluid

OR

Two of the following:

Metabolic acidosis with a base deficit of > 5 meq/L

Increased level of lactate (> 2 times the upper limit) urine output of < 0.5 ml/kg/hr

CRT > 5 sec

Core to peripheral temperature gap of > 3^0C gap

ARDS (Acute Respiratory Distress Syndrome) as per Berlin is defined as the acute onset (within one week of the clinical insult), bilateral opacities on chest X ray and respiratory failure not fully explained by heart failure or fluid overload.

Based on PaO2 /FiO2 of <300mm hg, severity of ARDS is classified as follows:

Mild : 300 ≥ Pao2 / FiO2 > 200 with PEEP ≥ 5 cm of H2O

Moderate: 200 ≥ PaO2 / FiO2 > 100 with PEEP of ≥ 5 cm of H2O

Severe : 100 ≥ PaO2 / Fio2 with PEEP ≥ 5 cm H2O

MODS (Multi Organ Dyesfunction Syndrome) : Presence of an altered organ function such that homeostasis cannot be maintained without medical intervention.[10]

Diagnosis of shock:

It is mainly a clinical diagnosis which is based on a thorough history and clinical examination [19,22.]

Lab findings:

CBC- Thrombocytopenia, anemia, elevated neutrophils

PS - elevated immature forms like bands, myelocytes, vacuolation of neutrophils, toxic granulations, dhole bodies

Hyperglycemia as a stress response

Hypocalcemia

Hypoalbuminemia

Metabolic acidosis

Patients with ARDS – reduced PaO2 & increased PaCO2

Fall in SVo2 measured by cooximetry

Elevated blood lactate levels (poor tissue oxygen delivery)

Treatment:

Initial step: Stabilisation of Airway, Breathing and Circulation Depending upon the severity of the shock, intubation can also be planned.

Rapid iv administration of 20ml/kg isotonic fluid; bolus can be repeated upto 60 to 80 ml/kg; sometimes fluid resuscitation can go upto 200ml/kg [23,25].

If refractory to initial fluid bolus, then vasopressor therapy is to be planned

Vasopressors used in PICU

1. **Dopamine :** causes increase in the contractility of the heart and a significant increase in the peripheral vasoconstriction at a dose of > 10 µg/kg/min.

   Dose is 3 - 20 µg/kg/min[20]

2. **Dobutamine:** Causes increase increase in the contractility and also is a peripheral vasodialator.

   Dose is 1 - 10 µg/kg/min

3. **Epinephrine:** Causes an increase in the heart rate and an increase in the contractility and is also a potent vasoconstrictor.

   Dose is 0.05 - 3 µg/kg/min

4. **Norepinephrine:** It is a potent vasoconstrictor but effect on cardiac contractility.

   Dose is 0.05 - 1.5 µg/kg/min

5. **Phenylephrine:** It is a potent vasoconstrictor

Dose is 0.5 - 2 μg/kg/min

6. **Corticosteroids:** Hydrocortisone should be reserved for use in children with fluid and catecholamine resistance and in adrenal insufficiency. Patients at risk include those with severe septic shock, purpura and those who received steroids for chronic illness. Hydrocortisone is given at a dose of 2 mg/kg iv

Additional early considerations:

Septic shock: Early administration of broad spectrum antimicrobial agents is associated with reduced mortality. Antimicrobials will have to be planned according to the suspected agent.

Distributive shock: Needs early initiation of vasoconstrictive agents to increase SVR though children with this shock benefits from fluid resuscitation only temporarily. In case of anaphylaxis, epinephrine would be the agent of choice[21]

Cardiogenic shock: They have poor cardiac output which is secondary to myocardial depression. Only small fluid boluses of 5-10ml/kg is recommended.

Then plan for early initiation of myocardial support with dopamine or epinephrine to improve cardiac output; Inspite of adequate cardiac output with inotrope, SVR is high and due to poor peripheral perfusion, an acidosis will persist. Hence use of milrinone will be beneficial for these children.

Obstructive shock: Here the mainstay of treatment will be the treatment of underlying cause like ICD for pneumothorax, thrombolysis for pulmonary embolism, initiation of PGE2 for duct dependent lesions

OBJECTIVE OF THE STUDY

- To study the clinical profile of children getting admitted with shock in PICU
- To analyse the etiology, risk factors, type, severity of shock
- To analyse the complications and outcome of shock

REVIEW OF LITERATURE

Shock is a frequent complication seen in pediatric emergency departments. Outcome of which depends upon the type and severity of shock at the time of presentation. Children with shock needs vigorous management in the form of fluid boluses, inotrope support and elective intubation in places where necessary. If left untreated in the early stages, it can progress rapidly to decompensated state and can be fatal. Here are some of the studies done in children with shock done in various parts of the country.

Kurade A, Dhanawade[26] et al, did a study on clinical profile and outcome of children with septic shock in PICU in a tertiary care referral hospital at Sangli, Maharashtra. The study period was from june 2010 to june 2013. Children in the age group of 1 month to 18 years were included in this study. 94(9%) out of 1035 children who got admitted had shock of which 53(56.3%) was septic shock. The male female ratio in the study was 20:23. The mean age was 3 years. The common presenting complaint among children with shock was fever (62.79%) followed by altered mental status in about 30.23%. Among these children, SIRS criteria was met in about 35(81.3%). The most common lab parameter that was found to be abnormal was elevated liver enzymes (86.04%) followed by anemia (62.79%). Next common abnormal parameter was leukocytosis (60.46%). Thrombocytopenia (55.81%) and coagulopathy (60.41%) were also seen. The most common etiology of sepsis was pneumonia (51.1%) followed by cellulitis/abscess

(30.2%). Blood culture was found to be positive in 18.6% in which the most common organism was found to be staphylococcus. Among the complications, the most common one was MODS (90.69%). Around 74.41% of the children presented with decompensated shock and about 97.67% required inotropes and majority of children (88.37%) had required mechanical ventilation. The mortality rate in this study was found to be 60.46% with a mean duration of PICU stay of 8.3 days. They have concluded saying that the most common type of shock encountered in PICU was septic shock and that carries a high mortality rate. Maximum number of children were under 1 year and the most common underlying etiology was pneumonia.

Mariam Santschi et al [27,] did a survey on the management of children with sepsis and septic shock among the pediatric intensivists of the Reseau Mere – Enfant de la Francophonie. The survey was done among the medical directors of 20 institutions spread over four continents. Survey was done from November 2010 to March 2011. Survey was conducted by asking the physicians to describe the typical management of the patients in their ICU. Certain questions will be asked, for eg- regarding investigations, fluid, catecholamine management etc... Only thirteen physicians have answered the questionnaire of which one was excluded as he was a neonatal intensive care unit. Only one PICU reported compliance to all the components of the first severe sepsis (sepsis resuscitation bundle). Three PICUs have reported compliance to all the elements of second severe sepsis bundle (sepsis

management bundle). In all the centres crystalloids were the fluid of choice but none of the centres have used colloids as first line fluid. About 58% of the centres considered using catecholamines if the child had not responded for 40-60ml/kg of fluid boluses. 25% of centres have started catecholamines after 20-40ml/kg of fluids, 8% have started after 60-80ml/kg of fluids and the remaining 8% would decide based on the ECHO findings. With regard to the choice of Catecholamine, 5 centres (42%) said they would start with norepinephrine, 3 (25%) dopamine, 2 (17%) dobutamine and 1 (8%) epinephrine. Intubation was considered in about 83% of centres; of which 2 (17%) would intubate on arrival. The medicines chosen to intubate were: atropine in about 36%, short acting neuromuscular blocking agents in 80%, ketamine alone in 57%, ketamine with opiates in 29% and 14% with etomidate. Only one (8%) have used benzodiazepines. 92% of centres would give steroids for refractory shock and 8% would give steroids on arrival. 75% of centres would not start insulin for hyperglycemia (10.5mmol/L blood glucose); 17% would start insulin without any protocol and 8% would \ start without any written consent. Finally they concluded that the intensivists had high adherence to the current recommendations in the management of sepsis and septic shock, regarding antibiotics, fluids boluses, inotropes and steroids.

Manjunatha Sarthi et al [28], did a study on adrenal status in children with septic shock using low dose stimulation test in a PICU of a tertiary care centre in northern India. The study was a cross sectional study to determine the prevalence of adrenal insufficiency in children with septic shock using a low dose snatched (1microgram) stimulation test. An increment of <9microgram/dl after stimulation test was considered as relative adrenal insufficiency. The samples for baseline cortical level were taken from children with sepsis but without shock for comparison purpose. And then 30 children (15 girls) with septic shock were included. The median cortical values at baseline, 30min and 60 min after stimulation for children without shock were 71(48.74-120.23), 78.1(56.9-138.15) and 91(56.17-166.4) respectively; whereas for children with shock, the median baseline cortical value was 11.5 microgram/dl. 9(30%) of these children had relative adrenal insufficiency of which 5(56%) died and among. The remaining 21 children, 10 died (p=0.69). So they have concluded saying that among the children with septic shock, those with relative adrenal insufficiency had a high incidence of catecholamine refractory shock (p=0.019) when compared to those with normal adrenal reserve but there was no significant difference in mortality (p=0.69).

Manasaranjan Upadhyay et al [29], did a study to compare the efficacy between crystalloid (normal saline) and colloid (polymer from gelatin in saline-hemaccel) for restoration of intravascular volume in

treating children with septic shock. The study design was a prospective, randomised, open label trial conducted in the department of paediatrics at PGI, Chandigarh. They have included 60 children between 1 and 12 months of age with septic shock but without any clinical evidence of organ failure. The outcome of the study was analysed based on the hemodynamic stabilisation in terms of heart rate, systolic blood pressure, capillary refill time, plasma volume at the end of resuscitation and the incidence of organ dysfunction. Finally the study was concluded saying that there was no significant difference in the efficacy among both the fluids in terms of hemodynamic stability and restoration of plasma volume. Normal saline upto 110ml/kg and gelatin polymer upto 70ml/kg were required in the 1st hour for successful outcome.

Indhumathy santhanam et al [30], did a study to know the gap between the knowledge and the skills for the implementation of ACCM/PALS septic shock guidelines in India. The objective of the study was to determine if the physicians are aware and had the skills to implement the American College of Critical Care Medicine/ Paediatric Advanced Life Support protocols for the management of septic shock. Study was conducted in four academic institutions in Chennai, Manipal, Mangalore and Trivandrum. Study period was between February and April 2006. Analysis was done based on pre and post lecture questions. 11 questions to test their knowledge and 10 questions to test their skills. Totally 118 delegates have participated. among

them 114 (97%) were pediatricians and 4 (3%) were anesthetists. Mean number of correct response for the 11 questions before the lecture was 2.1 and after the lecture was 4.07 respectively (p=0.001). Though 42% of the responders were aware of ACCM guidelines, 88 % of them did not follow the protocol in their practice; 86 %(n=101) did not feel comfortable in titrating the inotropes; 66 %(n=78) were not comfortable in intubating. 78 %(n=92) felt that central venous access was not much important in managing refractory shock; same way 67 %(n=78) felt that arterial pressure was not important in situations like refractory shock. 76 %(n=90) have never introduced an intraarterial catheter. They have concluded the study saying that the protocols in ACCM/PALS may be hard and inappropriate to be implemented in the current Indian setting. Hence simpler protocols are to be implemented to educate the community pediatricians inorder to have a better outcome.

Rujipat Samransamruajkit et al [31], studied the outcome of septic shock in children after utilizing the surviving sepsis campaign at Thailand. They have also studied the prognostic significance of the initial plasma NT-proBNP. They included children in the age group of 1 month to 15 years with severe sepsis or septic shock in the study. The initial blood collected was saved for NT-proBNP and procalcitonin levels. Totally 47 children were included in the study. It was noted that after starting to utilise the surviving sepsis campaign, there was a significant reduction in the mortality from 42% to 19% over a three year period.

Also they have concluded saying that a significant difference was noted in the initial plasma NT-proBNP values between the survivors and non survivors. But no significance was noted for the procalcitonin levels. NTproBNP level of more than 11,200pg/ml predicted the PICU mortality with a sensitivity and specificity of 85.7% and 90% respectively.

Suchitra Ranjit et al [32], did a study in a tertiary care PICU at Chennai to show the usefulness of bedside echocardiography to decide upon the management of fluid and inotrope refractory shock in children. In the study they have included children in whom the septic shock was unresolved despite 60ml/kg of fluid boluses in the first hour of management and refractory to dopamine / dobutamine at 5-10 micrograms/kg/min. The study was conducted from july 2005 to September 2007. Twenty two children (22) had satisfied the inclusion criteria. Among them 12 were case of warm septic shock and 10 were cold septic shock. The mean age group of these 22 children was 4.9 years and four children of less than 1 year were also there. The most common focus for these children with sepsis was pneumonia both community acquired and ventilator associated. Seventeen of these children were intubated and mechanically ventilated. Bedside echocardiography was done for all these children. The commonest echo finding noted was an uncorrected hypovolemia in about 12 children and 10 children had myocardial dysfunctioning. The type of echo finding and the intervention done were also discussed in the study. Seven of these children who had vasodilatory shock

with a normal left ventricular function were then given drugs with predominant vasopressor activity namely noradrenaline. Five of the children with warm septic shock had LV dysfunctioning, hence inotrope in the form of dobutamine or adrenaline were also started in addition to the fluid titration and the vasopressors. Five out of six of these children with cold shock were in volume deficit state. Among those five children, three of them also had myocardial dysfunctioning. Then among four children with vasoconstrictive shock, one child had collapsible IVC indicting volume depleted state and two children had myocardial depression. Hence they were also treated accordingly. The net outcome of the study was that shock was resolved in seventeen out of the twenty two children. For those ten children who had depressed myocardium, a repeat echo was done after 48 hours. The repeat echo showed normalisation of the cardiac functioning.

A Munde et al [33], did a study in a PICU at Delhi to see the relationship between the lactate clearance and PRISM (Pediatric Risk of Mortality) score with the mortality. They have included children in the age group of one month to thirteen years and the study was conducted between May 2012 and June 2013. Samples were collected from a total of 45 children. Serum lactate collected at the time of admission and six hours later was estimated using Radiometer Copenhagen ABL 555 blood gas analyser. Lactate clearance was then calculated by using the following formula: Initial lactate - Current lactate * 100 / Initial lactate. A positive value denotes there is

lactate clearance and a negative value indicates an increase in the serum lactate. Twelve out of forty five children died. The lactate clearance in those children who died was significantly low when compared to those who survived. It was a significant difference with a p value of (<0.001). The cut off for lactate clearance was taken as 30%. The mortality for those children with a lactate clearance of <30% was 90%; whereas it was only 8.5% for those who had a lactate clearance of >30%. The use of lactate clearance as a marker of mortality in PICU is associated with sensitivity and specificity of 75% and 97% respectively. In the same study it was also found that a high PRISM score (>30) was associated with a high prediction for mortality. PRISM score was significantly high (>30) for those who died when compared to those who survived with a p value of (<0.001).

Jay D. Fisher et al [34], studied the clinical spectrum of paediatric patients. Presenting with shock and those who developed shock in the emergency department. The study period was for 8 years from September 1998 to September 2006. Around 147 cases of shock were studied in this study. Of all the types of shock, in this study, the commonest cause of shock was found to be sepsis, around 57%. Of this a pathogen was identified in about 45% cases. The next commonest cause of shock was found to be hypovolemia (14%). Distributive shock accounted for about 14% of cases. Cardiogenic shock was seen in around 5% of cases. The mean fluid requirement in children with septic shock was 58ml/kg; While in other types

of shock, the requirement was about 50ml/kg. Apart from the fluids, vasopressor requirement was seen in 41%. Intubation and mechanical ventilation was required in about 21% of cases. Apart from those who presented with shock, the study also analysed the number of children who developed shock after the admission in an emergency department. It was found that around 14% of children developed shock after admission; causes of such shock included administration of antimicrobials and a lumbar puncture. The overall mortality of shock was 6%. Whereas among septic shock, the mortality was found to be 5%. Another important finding noted in this study with regard to clinical finding was that, as the child's age increases, hypotension is the prevalent clinical sign of shock[35].

Rabindran et al [36-38], did a study to report the biochemical markers that can be used to predict the morbidity and mortality for children with septic shock in Billroth hospital, Chennai. As known already, high lactate levels are associated more with increased mortality; also lactate has a better prognostic value in septic shock than the tumor necrosis factor (TNF) and interleukin-6. The survival in septic shock was noted to be better if lactate has decreased in one hour of treatment. Next is the absolute neutrophil count; a count of $<1500/mm^3$ is associated with increased incidence of septic shock than those with a count of >1500 cells/mm^3. Procalcitonin, Brain natriuretic peptide and caridac troponin T assay were also found to be sensitive markers of mortality in septic shock. IL-8 of <220pg/ml was useful in predicting the survival of

septic shock with an accuracy of 95% and a value of >220pg/ml had 75% sensitivity for predicting he mortality. Increased CD11b expression on neutrophils was associated with increased organ failure in septic shock [39]. Other markers like elevated D-dimer, high mottling score, tissue oxygen saturation and derangements of endothelin mediators like VEGF AND sFLT were associated with increased mortality and prolonged hospitalisation. The three biochemical markers namely CCL3, HSPA1B and IL-8 had a sensitivity of 93% and specificity of 74% in predicting he mortality. TREM-1 (tranmembrane glycoprotein) of >300pg/ml had a sensitivity of 78% and specificity of 97% in predicting the mortality in septic shock.

En-Pei Lee et al [40], did a study in a PICU at Taiwan. The study was conducted from 2003 to 2016. Children included in the study were in the age group of 1 month to 18 years. They have retrospectively analysed 50 children with shock. Out of which 37 were septic shock children and 3 were cardiogenic shock children. The mean age was higher in the septic shock group (12.2$\pm$4.5) than the cardiogenic shock (9.1$\pm$6.1). The aim of the study was to study the hemodynamic parameters associated with mortality in these two shocks. The parameters like cardiac output was higher in the septic shock group than in the cardiogenic shock. The parameters of cardiac contractility like cardiac index was significantly higher in the septic shock group with a p value of 0.011; the GEF (ejection fraction) was also high in the septic shock group with a p value of 0.001.

The cardiac function index was found to be significantly high in the septic shock group with a p value of <0.001. The preload and afterload were also significantly higher with a p value of 0.05 in the cardiogenic shock. MAP was significantly lower in the non survivors than in the suvivor group of septic shock with a p value of <0.05. They have concluded saying that among the non survivors of the cardiogenic shock group, cardiac index was significantly lower at the time of admission and after 24 hours of admission with a p value of <0.05. And among the non survivors of septic shock, the systemic vascular resistance was significantly lower with a p value of <0.001.

Daljit singh et al [41], did a prospective study to analyse the etiology, type and outcome of shock among the children in the age group of 1 month to 15 years in Dayanand hospital at Punjab from July 2001 to December 2002. They included a total of 98 cases with a mean age group of 2.8±3.4 years. Out of the 98 cases, 39 were found to be in infancy. The male : female ratio of that 98 children was 1.6:1. The most common type of shock was hypovolemic followed by septic, cardiogenic and distributive. 88.9% of the hypovolemic shock cases presented in compensated stage whereas in septic shock only 27% of the cases presented in compensated stage. Only 3 cases of septic shock had blood culture positive with staphylococcus aureus. Among the cases of cardiogenic shock, 53% were congenital heart disease children and 23.5% were cardiomyopathy cases. The over all survival was 74%. The survival was maximum for hypovolemic shock with a p value of < 0.01; followed by

53.3% in septic shock and 43.7% in cardiogenic shock. Out of the 24 children who died, 23 presented in the decompensated stage. Twenty two children required ventilatory support in which 70% of children expired. Inotrope support was required in 45 children out of which 24 children died. They have concluded saying that rather than the age of the patient, it is the stage of shock at the time of presentation that determines the outcome. Shock itself is common among infants than in any other age groups. The commonest type of shock was hypovolemic shock with common etiologies being vomiting, diarrhea and it had the best prognosis. While the septic shock presenting in decompensated stage had the worst prognosis.

A Haque et al, did a study at Pakistan to know the association between the Vasoactive Inotrope Score (VIS) and mortality of shock. They have included children in the age group of one month to sixteen years and with fluid refractory shock. It was a retrospective study. It was done for a period of two years from January 2011 to December 2012. A total of 71 children were assessed. Vasoactive Inotrope Score (VIS) was calculated for these children for first 48 hours. The cut-off value for VIS score was taken as 20 based on which the groups were classified. Children with a score of > 20 were categorised as High VIS group (Group-H) and those with a score of < 20 were categorised as Low VIS group (Group-L). 73% of the children were in the Group-L. It was found that the mortality rate for children in Group-L was 38.9% and for those in Group-H was 100%. The overall mortality and case

specific mortality of that PICU were 12% and 59.2% respectively; Of which the children with fluid refractory shock was 6.3%. And the mortality rate was 23 (38.9%) in Group-L and 19 (100%) for Group-H. They have concluded that high inotrope score was associated with high mortality when compared to the low VIS score group.

Arigela et al, did a study in a tertiary care hospital at Andhra Pradhesh in the period of December 2014 to June 2016. It was a prospective study. Children included in the study were in the age group was one month to twelve years and those who had clinical diagnosis of shock after a written consent from the parents. Out of 75 children. 69.33% had septic shock, 25.33% had hypovolemic shock, 2.66% had distributive shock and 2.66% had cardiogenic shock. In that 75 children, 74.66% had survived, 25.33% died. According to their study the mortality rate was highest for cardiogenic shock (100%) followed by septic shock with a mortality rate of 28.84% and hypovolemic shock with 10.52%. So they have concluded saying that the commonest type of shock was septic shock. Most common cause of sepsis was pneumonia (32.69%) followed by sepsis (25%), dengue fever (19.23%) and CNS infections (17.3%). The commonest cause of hypovolemic shock was acute gastroenteritis [42-44]. There was a significant difference in the systolic blood pressure of infants between the survivors and non survivors with a p value of 0.014. The GCS and SpO2 were also significantly low among the non survivors than the survivors. The need for mechanical ventilation for

survivors was 16.07% and for non survivors was 73.68%. Children who required mechanical ventilation and inotropes were associated with poor prognosis. In this study the low mortality rate for septic shock was due to the early recognition of the shock and vigorous management according to the unit protocols and regular monitoring.

Nathan Ford et al [44], did a study to analyse the mortality after fluid bolus in children with septic shock. They included thirteen studies which met their inclusion criteria. There was a better mortality outcome at 48 hours for children with general septic shock with RR 0.69; 95% CI 0.54 - 0.89 and children with malaria with RR 0.64; 95% CI 0.45 - 0.91 when no bolus was given when compared to giving any bolus. This result was driven by a high quality trial (The FEAST trial). But they couldn't find any evidence to analyse the mortality of children with dengue fever or severe malnutrition who were treated with and without bolus. With regard to type of fluid bolus the efficacy of colloid and crystalloid were the same in all the subgroups of shock. So they have concluded saying that fluid boluses were harmful when compared to no bolus. Hence, they have emphasised on the need of simple protocols for the health care providers to decide upon who will get benefited from bolus and who will not.

Rousseaux et al, did a study to report the prognostic value of shock index in children with septic shock. Shock index (SI) is the ratio of heart rate and systolic blood pressure. It is a non-invasive measure of assessing the

hemodynamic status of the child which helps in early recognition of severe sepsis. The objective of this study was to establish the usefulness of this index in prognosticating the septic shock. It was a retrospective study. It was performed in the PICU at a university hospital. The parameters needed for the study were collected at 0,1,2,4 and 6 hours since admission . The data collected were heart rate, systolic blood pressure and lactate concentration. Totally 146 children were included in the study who got admitted in the period between January 2000 and April 2010 with septic shock. They have then divided the patients into two groups based on their outcome namely Survivors and Non-Survivors. Shock Index showed a significant difference between the two groups at 0,4 and 6 hours after admission with a value of 0.02, 0.03 and 0.008 respectively. If the shock index was abnormal both at admission and at 6 hours, it was predictive of death with a relative risk of 1.36. They have concluded saying that shock index was clinically relevant and were useful for predicting the mortality. Rather than using heart rate and systolic blood pressure alone shock index would be better for early recognition of severe sepsis and to know the prognosis.

Sarah J. Atkinson et al [45], conducted a retrospective analysis to determine the association between Corticosteroids and outcome in children with septic shock. A total of 496 subjects were included in the study . They were divided into two groups namely subjects who received corticosteroids during the first seven days of admission and those who did not receive the

steroids. According to this study the terms 28-day mortality and complicated course are defined as death within 28 days and persistence of two or more organ failures at 7 days. First they have shown the association between corticosteroids and mortality. There were 64 deaths and the use of corticosteroids was significantly associated. With increased risk of death with a value of 0.004. Then the association between corticosteroids and complicated course was studied. It was found that there were 133 children who had a complicated course. So with the use of corticosteroids there was a significant increase in the risk of complicated course with a p value of 0.012. Next analysis of subjects without comorbidities in those who received steroids was done. There were a total of 321 subjects among them 79% were given hydrocortisone, 15 % with methylprednisolone and 6 % with dexamethasone. They have also analysed the association between corticosteroids and outcome by using PRISM score. According to the PRISM score they have divided the children into low, medium and high risk groups and they have analysed the association between mortality and corticosteroid use for each group. It was found that there was no association between corticosteroids and mortality with any group. Same way there was no association between use of corticosteroid and complicated course in any group. Also they have analysed children without comorbidities and grouped them into corticosteroid received and not received. It was found that children who received corticosteroids were found to have a greater requirement of inotropes more severe illness, high organ failure and a high mortality when compared to children who did not

receive corticosteroids. So they have concluded saying that this risk stratified analysis failed to demonstrate any benefit from corticosteroids in septic shock children.

METHODOLOGY

Setting:

This was a prospective observational study conducted in Pediatric Intensive Care Unit (PICU) in Chengalpattu Medical College.

Duration of the study:

Study was done for a period of one year from September 2016 to August 2017.

Population and sample size:

The study included children in the age group of 1 month to 12 years.

The sample size of the study was 100.

Inclusion criteria:

All children in this age group who were admitted with shock were analysed. The diagnosis of shock was made clinically based on the findings like tachycardia, weak or absent distal pulses, a gap between the core-peripheral temperature and capillary refill time. Tachycardia [45-46] was defined as Heart rate[45-46]: 2 months to 2 years > 160 bpm ; 2 to 8 years >110 bpm ; above 8 years > 90 bpm.

Weak distal pulses were made by comparing dorsalis pedis and femoral pulses. Normal femoral pulse is denoted as +++ and dorsalis pulse as

++ . Bounding and weak dorsalis pulses will be denoted as +++ and + respectively. Core-peripheral temperature gap is demonstrated by placing the dorsal aspect of one hand over the abdomen while the dorsal aspect of the other hand will be used to compare temperature over lower aspect of the body with that of the abdomen. Capillary refill time being prolonged is a sign of poor peripheral perfusion. It is demonstrated by lifting the child's soul above the level of heart and applying an enough pressure to blanch the skin. Normal time taken for refill is less than 2 seconds while in shock it is more than 2 seconds; in warm septic shock it is seen as flash refill. Pulse Pressure (PP) was classified as Normal , Wide and narrow. normal PP is 30 - 40 mm Hg, wide PP is > 40 mm Hg, narrow PP is < 20 mm Hg

The parameters like heart rate, blood Pressure (sytolic, diastolic and pulse P ressure) may vary depending upon the etiology and severity of the shock. A total of 100 children were included in the study.

Exclusion criteria:

Neonates with shock, children with shock treated outside and details unavailable where excluded in the study. Children were recruited for the study after informed consent from parents or care givers at the time of admission.

Materials and methods:

Detailed history including age, gender, fever, convulsions, breathlessness, rashes, vomitting , diarrhea , duration of onset of illsness , pre

Hospitalisation and pre Hospital management were collected. Following this children were subjected for a detailed clinical examination. Clinical features at the time of admission were recorded. The parameters included temperature, heart rate, respiratory rate, capillary refill time, sensorium and blood pressure. The sensorium of the child was classified as A (Alert) , V (Verbal) , P (Pain Responsive) and U (Unresponsive) as per the PEMC guidelines rather than the GCS. Based on the clinical findings and history from the mother / guardian, shock was classified as hypovolemic , septic, cardiogenic and anaphylactic. Based on the blood pressure, severity of shock was classified as compensated [Normal systolic blood pressure: SBP-{(2×age) + 70}] / decompensated (systolic blood pressure less than the expected for that age.

Following the clinical examination all children were subjected to the investigations as per the unit protocol. The investigation included total counts, peripheral smear, urea, creatinine, serum sodium, potassium, SGOT, SGPT, CRP, blood culture, chest xray and ECHO. The treatment for all the shock children depends upon the etiology and severity at the time of presentation. The amount of fluid boluses and need for inotropes were decided based on guidelines from PEMC and PALS . The need for ventilation and duration of stay in the ICU are also included in the study. All these children were followed up until their Outcome for complications like MODS, renal failure, ARDS, coagulopathy, DIVC and dyselectrolytemia. Platelet counts and

hematocrit were frequently monitored for children with dengue shock syndrome.

Final diagnosis was arrived in these children based on Clinical and / or laboratory features for the common pediatric infection. Outcome was then classified as discharged , death and referred . The study was approved by institutional ethical committee. The data were entered in excel spreadsheet and analysed using SPSS software Version 21 . Simple calculation like proportions, percentages and mean values were derived.

Appropriate statistical test like Chi-Square test , T test were used to compare the study parameters between the survivors and non-survivors. The parameters which had a statistical significance with a p value of < 0.05 were further analysed by multivariate analysis.

OBSERVATION AND RESULTS

The study included 100 children with shock.. In this study, group 1 refers to survivors and group 2 refers to non survivors. Since the study subjects n=100, this will be mentioned as n=% in the result section in all statistical analysis involving the entire study group. Demographics like age and gender were analysed using simple statistics like proportions.

A schematic representation of the study is shown below :

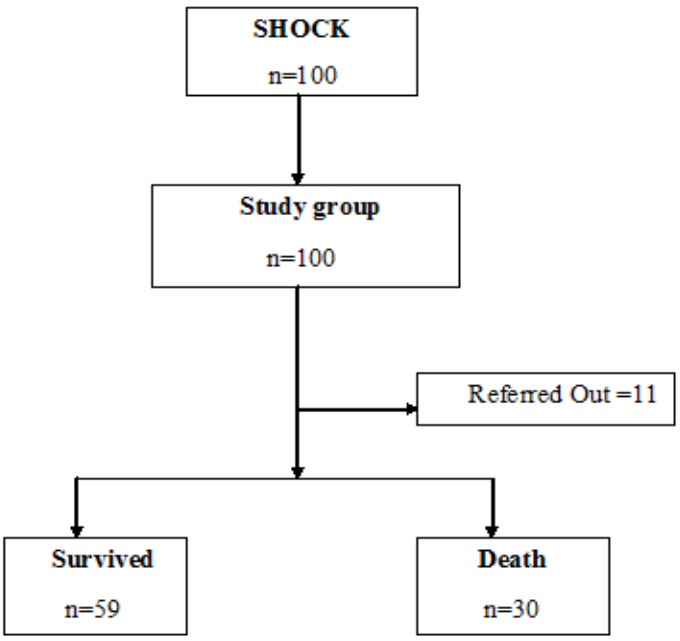

Figure 2: Number of cases in shock

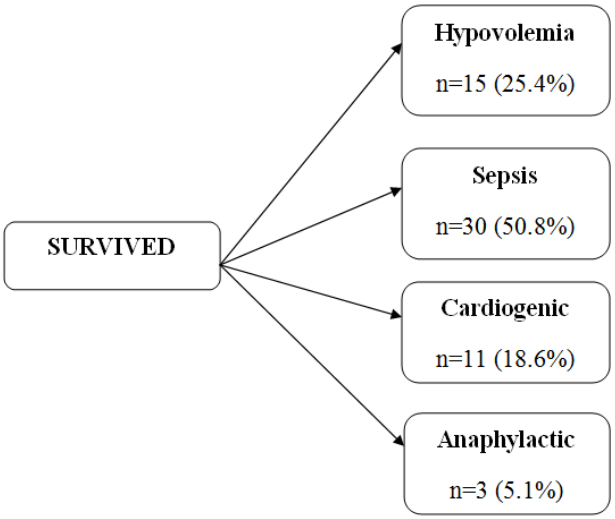

Figure 3: Types of shock among survivors

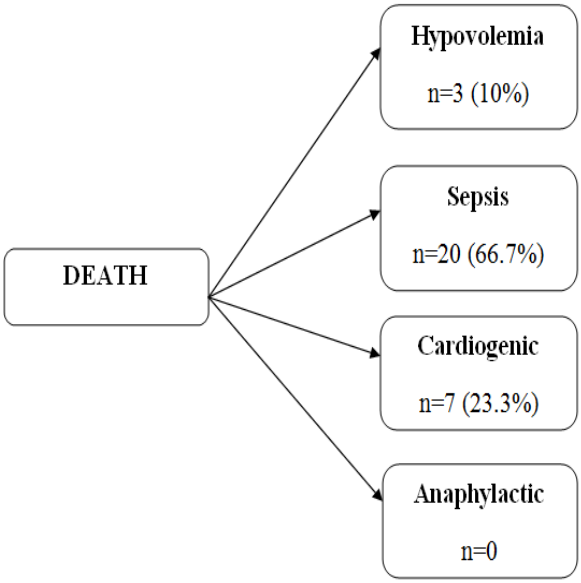

Figure 4: Types of shock among non-survivors

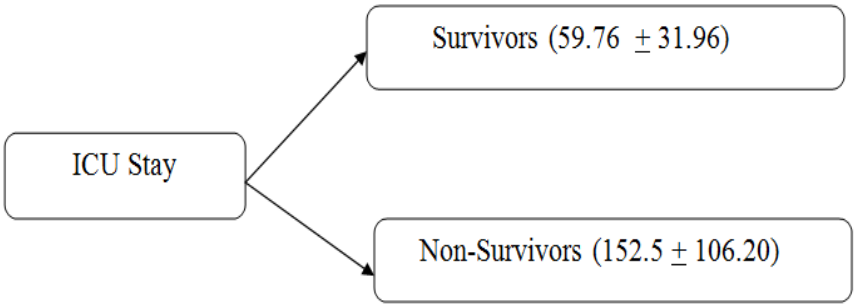

Figure 5: Duration of ICU stay among survivors and non-survivors

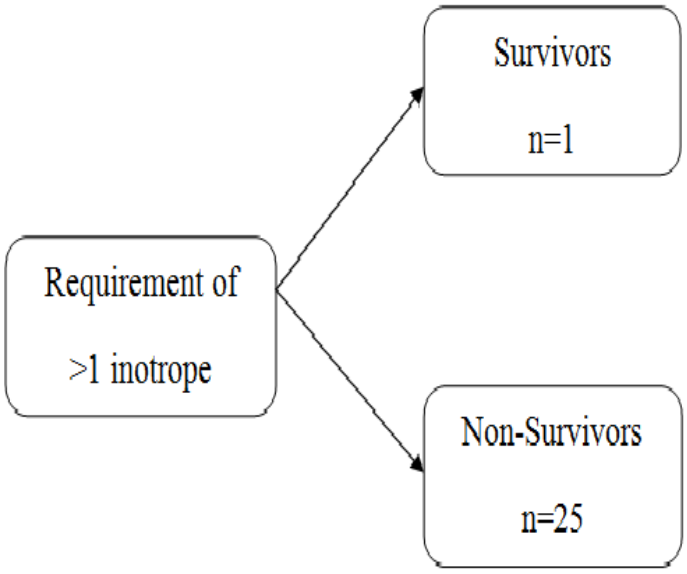

Figure 6: Requirement of inotropes among survivors and non-survivors

Out of the 100 children, 59 survived, 30 children died and 11 were referred out. Since the details about children who were referred are not known, analysis was done among survivors and non survivors excluding those 11 children.

1. Gender distribution :

Table 3: Gender distribution

S.No	Parameter	Male (n=51)	Female (n=49)
1	Gender	51(50%)	49(48%)

The table (3) shows gender distribution. Among the 100 children, no of males were 51 (50%) and females were 49 (48 %). The male is to female ratio was found to be 1.4 : 1 which is depicted in the following pie diagram (7)

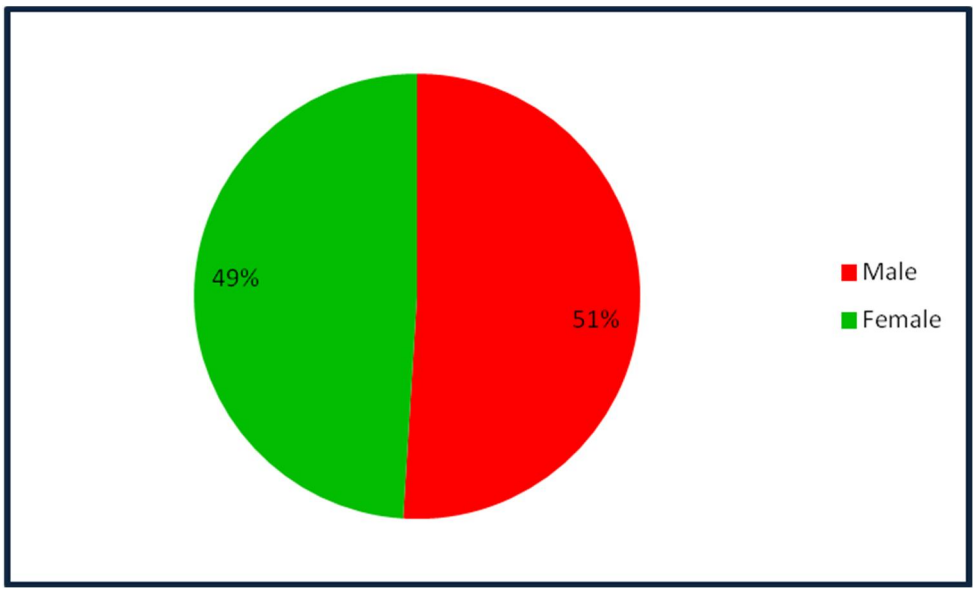

Figure 7: Gender distribution

Gender distribution among Survivors and non-survivors is depicted in the following table (4):

Table 4: Gender distribution among survivors and non-survivors

Gender	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Female	28(47.5)	15(50.0)	43	0.903
Male	31(52.50)	15(50.0)	46	
Total	59	30	89	

Children who survived were categorised as Group1 and those who didnot survive as Group 2. 28 (47.5 %) girls and 31(52.50%) boys have survived. 15(50%) girls and 15(50%) boys died.

Age Distribution:

The study comprised of children between 1 month and 12 years of age, They were classified as infants, toddlers, pre-school children and school children. The following table (5) shows age wise distribution:

Table 5: Age Distribution

S.No	Age(years)	Frequency / Percentage
1	< 1 year	46%
2	1 - 3 years	23%
3	3 - 5 years	6%
4	> 5 years	25%

Out of the 100 children, 46% were less than 1 year, 23 % were between 1 and 3 years, 6% were between 3 and 5 years and 25 % children were above 5 years.

The same is depicted in the following picture (8).

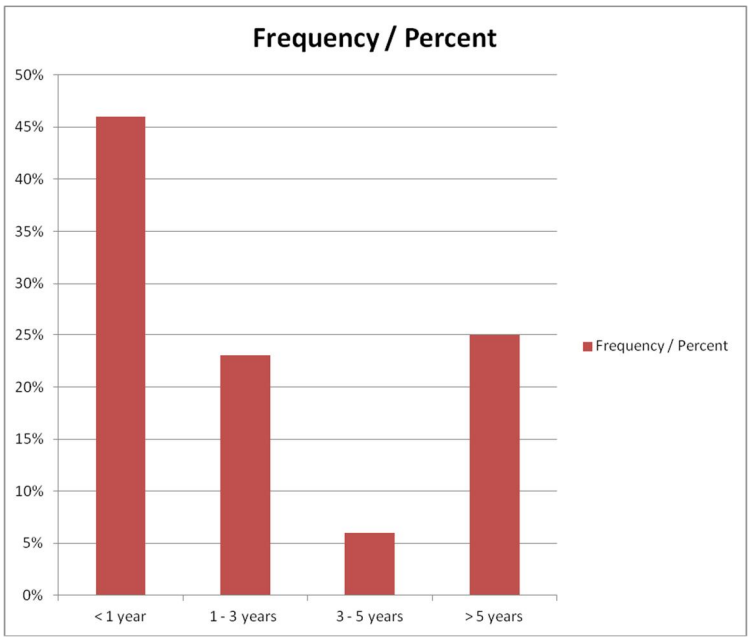

Figure 8: Age distribution

3. Age and Sex Distribution

Male and female children in various age group in this study is shown in the following table (6):

Table 6: Age and gender distribution

Age	Females	Males
(years)	(n=49)	(n=51)
< 1 year	24	22
1-3 years	10	13
3-5 years	3	3
>5 years	12	13

In infancy, females were more affected than males. Among pre-school children males and females were equally affected and among toddlers and school children males were more affected than females. This is depicted in the following picture (9):

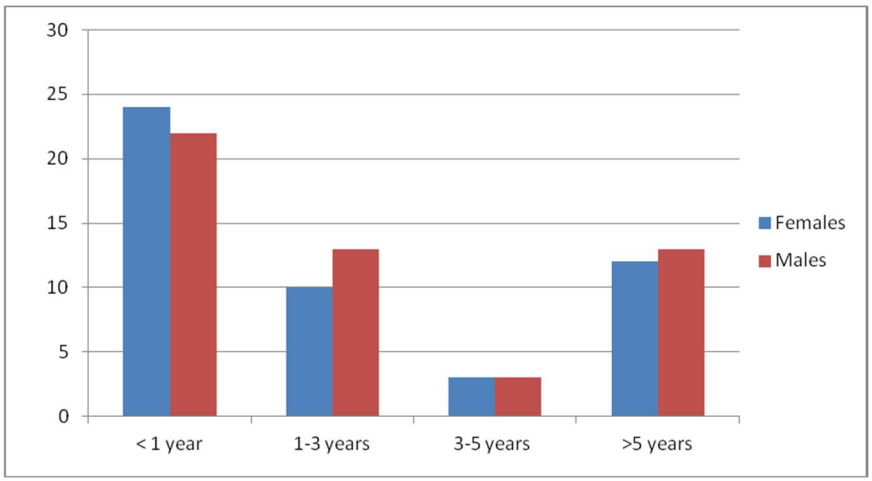

Figure 9: Age and gender distribution

4. Presenting symptoms:

Table 7: Presenting symptoms

S.NO	Clinical Parameter	Present	Absent
1	Fever	62(61.8%)	38(37.4%)
2	Convulsions	51(50%)	49(48%)
3	Breathlessness	42(41.2%)	58(56.9%)
4	Rashes	13(12.2%)	87(85.3%)
5	Vomiting	59(57.8%)	41(40.2%)
6	Diarrhoea	23(22.5%)	77(75.5%)
7	Obvious focus	71(69.6%)	29(28.4%)
8	Pre hospitaliation	42(41.2%)	58(56.9%)

In this study 60 (58.8 %) children had fever, 51(50%) had convulsions, 42(41.2%) had breathlessness, 13(12.2%) had rashes, 59(57.8 5) had vomiting, 23(22.55) had diarrhoea, 71(68.6%) had obvious focus, 42(41.2 5) had a history of prehospitalisation. The table () shows the presenting symptom among the 100 children. The same is depicted in the following figure (10).

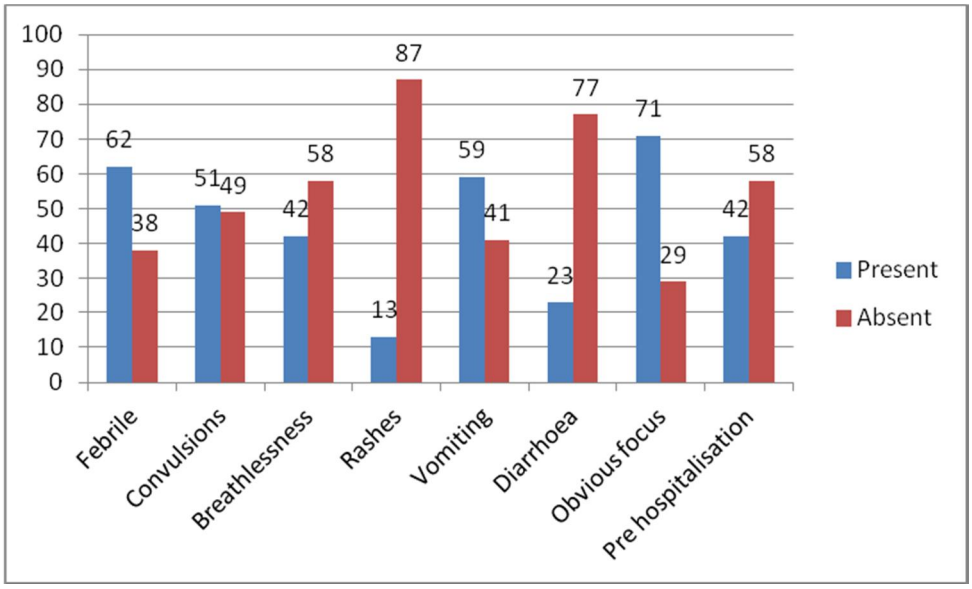

Figure 10: Presenting symptoms

And the same as been compared between Survivors and Non-Survivors and is shown in the following tables:

Table 8: Fever among survivors and non-survivors

Fever	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	34(57.6%)	20(66.7%)	59	0.644
Absent	25(42.4%)	10(33.3%)	30	
Total			89	

Table (8) shows that among the survivors 34 children were febrile and 25 were afebrile while among non-survivors 18 were ferbrile and 12 were afebrile.

Table 9: Convulsions among survivors and non-survivors

Convulsions	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	16(27.1)	13(43.3)	29	0.282
Absent	43(72.9)	17(56.70)	60	
Total	59	30	89	

Table (9) shows that among the survivors 16 children had convulsions while among non survivors 13 had convulsions.

Table 10: Breathlessness among survivors and non-survivors

Breathlessness	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	21(35.60)	14(46.70)	35	0.185
Absent	38(64.40)	16(53.30)	54	
Total	59	30	89	

Table (10) shows that among the survivors 21 children had breathlessness while among non survivors 14 children had breathlessness.

Table 11: Rashes among survivors and non-survivors

Rashes	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	10(16.90)	2(6.70)	12	0.363
Absent	49(83.10)	28(93.90)	77	
Total	59	30	89	

Table (11) shows that among the survivors 10 children had rashes while among non survivors 2 children had rashes.

Table 12: Vomiting among survivors and non-survivors

Vomiting	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	35(59.30)	18(60.00)	53	0.949
Absent	24(40.70)	12(40.00)	36	
Total	59	30	89	

Table (12) among survivors 35 children had vomiting while among non survivors 18 children had vomiting.

Table 13: Diarrhoea among survivors and non-survivors

Diarrhoea	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	17(28.80)	6(20.00)	23	0.102
Absent	42(71.20)	24(80.00)	66	
Total	59	30	89	

Table (13) shows that among the survivors 17 children had diarrhea while among the non survivors 6 children had diarrhoea.

Table 14: Pre-hospitalisation among survivors and non-survivors

Pre Hospitalisation	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Present	31(52.50)	8(26.70)	39	0.038
Absent	28(47.50)	22(73.70)	50	
Total	59	30	89	

Table (14) shows that among the survivors 31 children had history of prehospitalisation while among the non-survivors 8 had history of prehospitalisation. All the above parameters have been compared between Survivors and Non-Survivors and is depicted in the following picture (11):

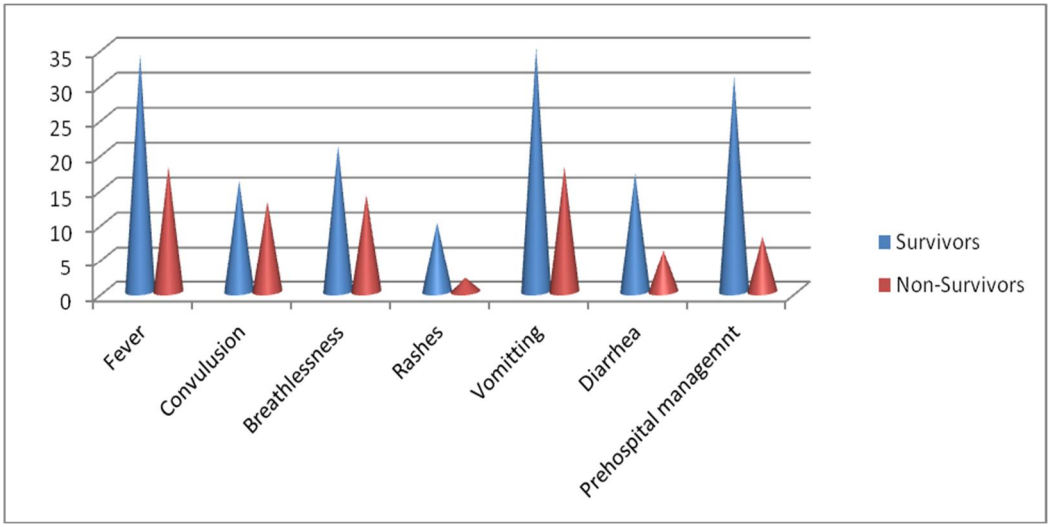

Figure 11: Presenting symptoms among survivors and non-survivors

5. Duration of onset of illness:

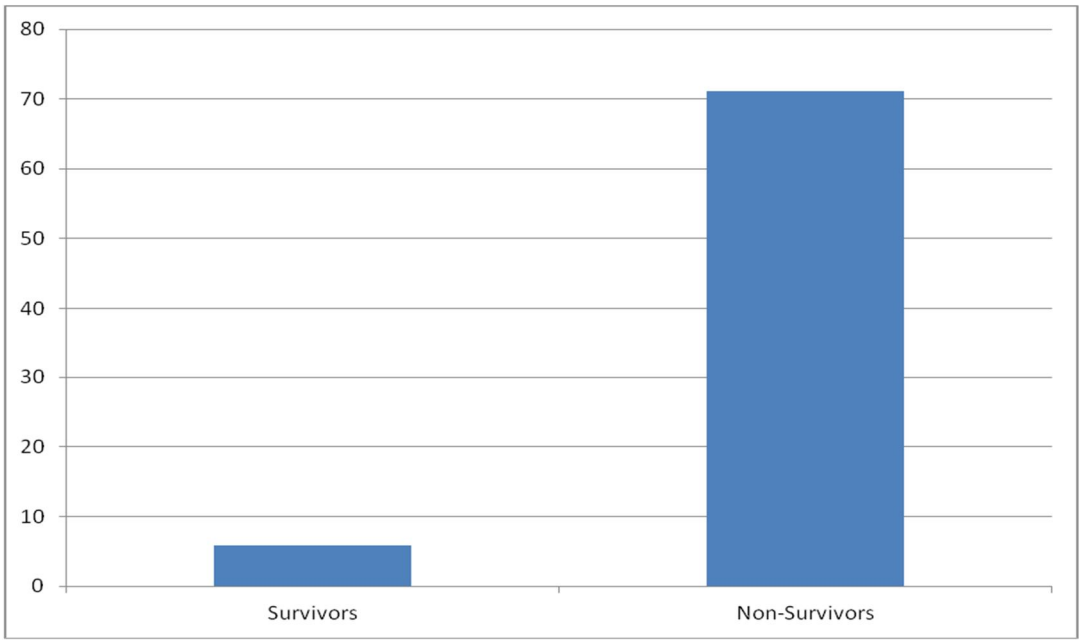

Figure 12: Duration of illness among survivors and non-survivors

The median duration of onset of illness was 72 hours with 25th to 75th interquartile percentile of 24 hours and 96 hours respectively.

The same has been compared between survivors and non-survivor and is depicted in the following picture (12):

6. Pre-Hospital Management:

Table 15: Pre-hospitalisation management

S.No	Pre-Hospitalisation Management	Frequency/Percentage
1	IV Fluid	26(26.5%)
2	Antibiotic	8(7.7%)
3	ASV	4(5.9%)
4	Prazosin	3(2.9%)
5	None	59(57.8%)

Among the 100 children, before hospitalisation IV fluids were given for 26 children, IV/Oral antibiotics for 8 children, ASV for 4 children, oral prazosin for 3 children and about 59 children have not taken any treatment. This is shown in the above table (15)

7. Clinical Parameters:

Table 16: Vital signs

S.No	Parameter	Mean±Std. Deviation
1	Heart rate	161.32±35.07
2	Respiratory rate	45.3±24.81
3	Temperature	101.10±2.81
4	Systolic BP	80.92±16.4
5	Pulse Pressure	35.55±10.38

All the children in the study group were evaluated with their vital signs at admission and the findings are tabulated in the following table (16):

8. **Physiological status at the time of admission :**

Table 17: Physiological status

S.No	Clinical Parameter	A	V	P	U
1	Sensorium	11(10.8%)	35(34.3%)	24(23.57%)	30(29.4%)

Among the 100 children, 11 children were alert (A), 35 children were verbal (V), 24 were pain responsive (P) and 30 were unresponsive (U) at the time of admission. The same is depicted in the above table (17)

9. Pulse Pressure:

Table 18: Pulse pressure

S.No	Parameter	Frequency/Percentage
1	Normal	63
2	Wide	24
3	Narrow	13

The above table (18) shows that pulse pressure was normal in 63 children, wide in 24 children and narrow in 13 children.

10. Severity of shock:

The following table (19) shows the no of children with compensated and decompensated shock at the time of admission:

Table 19: Severity of shock

S. NO	Severity of Shock	Frequency / Percentage
1	Compensated	87%
2	Decompensated	13%

The same has been depicted in the following picture (13):

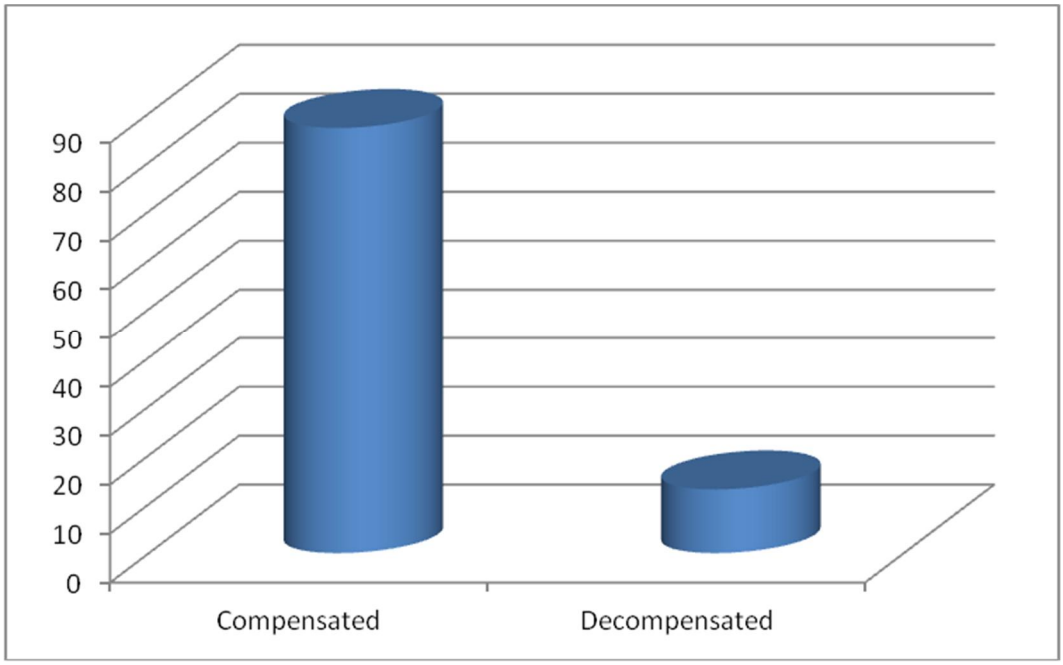

Figure 13: Severity of shock

11. Type of Shock:

Table 20: Type of shock

S.No	Type of Shock	Frequency/Percentage
1	Hypovolemic	21
2	Cardiogenic	20
3	Distributive	59

Among the 100 children, 21 were admitted with Hypovolemic shock, 59 were admitted with distributive shock and 20 with cardiogenic shock. This is shown in the above table (20).

The same has been compared between survivors and non-survivors and depicted in the following table (21) and picture (14):

Table 21: Type of shock among survivors and non-survivors

Type of Shock	Survivors (n=59) (n%)	Non-Survivors (n=30) (n%)
Hypovolemic	15(25.4%)	4(13.3%)
Cardiogenic	11(18.6%)	7(23.3%)
Distributive	33(55.9%)	19(63.3%)

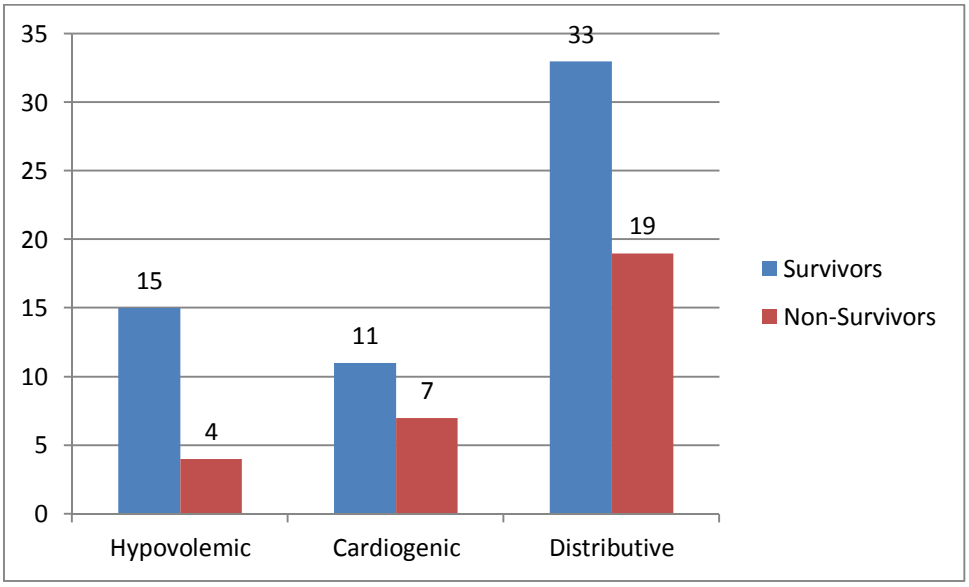

Figure 14: Type of shock among survivors and non-survivors

12. Severity in each type of shock:

The following table (22) shows the no. of children admitted with Compensated and decompensate stage in each type of shock:

Table 22: Severity of shock in each type

Type of Shock	Compensated (n=87)	Decompensated (n=13)
Hypovolemic	8	12
Septic	56	1
Cardiogenic	20	0
Anaphylatic	3	0

The same has been compared between survivors and non-survivors and is shown in the following table (23):

Table 23: Comparison of severity of shock among survivors and non-survivors

Type of Shock	Compensated	Decompensated	Survivors	Non-Survivors
Hypovolemic	8	12	15	3
Septic	56	1	30	20
Cardiogenic	20	0	11	7
Anaphylatic	3	0	3	0

13. Fluid Bolus:

Table 24: Requirement of fluid bolus

S.No	Fluid Bolus (ml/kg)	Frequency/Percentage
1	<40	51
2	40 to 80	48
3	>80	1

Among the 100 children, 51 children required < 40 ml/kg, 48 children required 40 to 80 ml/kg , 1 child required >80 ml/kg. This is shown in the above table (24)

The same has been compared among survivors and non-survivors and table (25) depicts it:

Table 25: Requirement of fluid bolus among survivors & non-survivors

Fluid Bolus (ml/kg)	Group1 (n=59) n(%)	Group2 (n=30) n (%)	Total	p Value
<40	30(50.8%)	14(46.7%)	44	0.535
40 to 80	29(49.2%)	15(50%)	44	
>80	0	1(3.3%)	1	
Total	59	30	89	

14. Requirement of inotrope:

Table 26 : No. of inotropes required

S.No	No of inotropes required	Frequency/Percentage
1	One inotrope	44(43.1%)
2	Two inotropes	18(17.6%)
3	Three inotropes	8(7.8%)
4	Not Given	30(29.4%)

The above table (26) shows that among the 100 children, 44 children required one inotrope, 18 children required two inotropes, 8 children required three inotropes and 30 were not given. The same was compared between Survivors and Non-Survivors in the following table (27) and picture (15):

Table 27 : No. of inotropes among survivors and non-survivors

No of Inotropes	Group1 (n=59) n (%)	Group2 (n=30) n (%)	Total	p Value
One inotrope	30(50.80)	5(16.70)	35	0.00
Two inotropes	1(1.70)	17(56.70)	18	
Three inotropes	0(0.00)	8(26.70)	8	
Not Given	28(47.50)	0(0.00)	28	
Total	59	30	89	

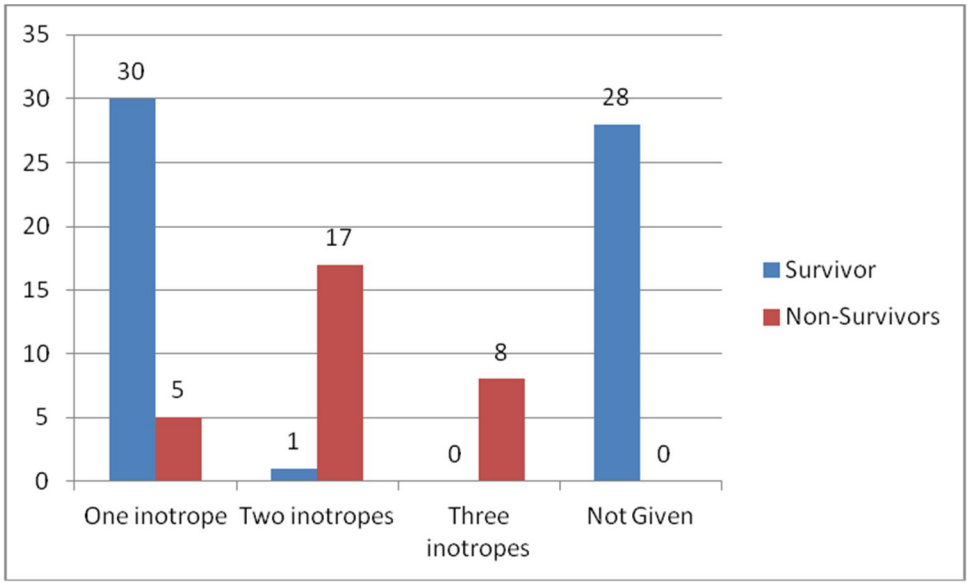

Figure 15: Requirement of inotropes among survivors and non-survivors

14. Steroid Response:

Table 28: Steroid response

S.No	Steroid Response	Frequency/Percentage
1	Responded	-
2	Not responded	24(23.57%)
3	Not given	76(74.5%)

The above table (28) shows that among 100 children, steroid was given for 24 children and the remaining 76 children didnot receive steroid. In all those 24 children, shock persisted despite corticosteroid therapy

15. Requirement of inotrope and ventilation :

Table 29: Requirement of ventilation and inotropes

S.No	Parameter	Required n (%)	Not Required n (%)
1	Inotrope	70(68.6%)	30(29.4%)
2	Ventilation	58(56.9%)	42(41.2%)

Among all the children included under the study, 70 children have required inotrope and 58 children have required ventilation and the above table (29) shows this data. The same has been compared between survivors and non-survivors and depicted in the following tables (30) & (31) and pictures (16) & (17):

Table 30: Requirement of inotropes among survivors and non-survivors

Inotrope	Group1 (n=59) (n %)	Group2 (n=30) (n %)	Total	p Value
Required	31(52.50)	30(100.00)	61	0.00
Not Required	28(47.50)	0(0.00)	28	
Total	59	30	89	

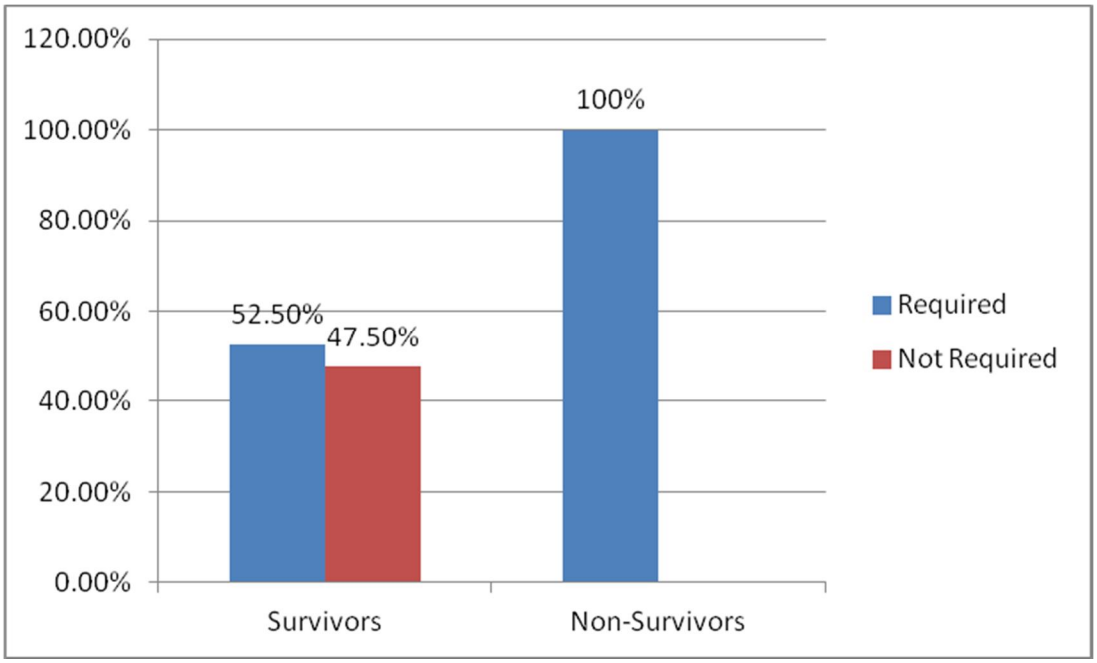

Figure 16: Requirement of inotropes among survivors and non-survivors

Table 31: Requirement of ventilation among survivors and non-survivors

Ventilation	Group1 (n=59) (n%)	Group2 (n=59) (n%)	Total	p Value
Required	19(32.30)	30(100.00)	49	0
Not Required	40(67.80)	0.00)	40	
Total	59	30	89	

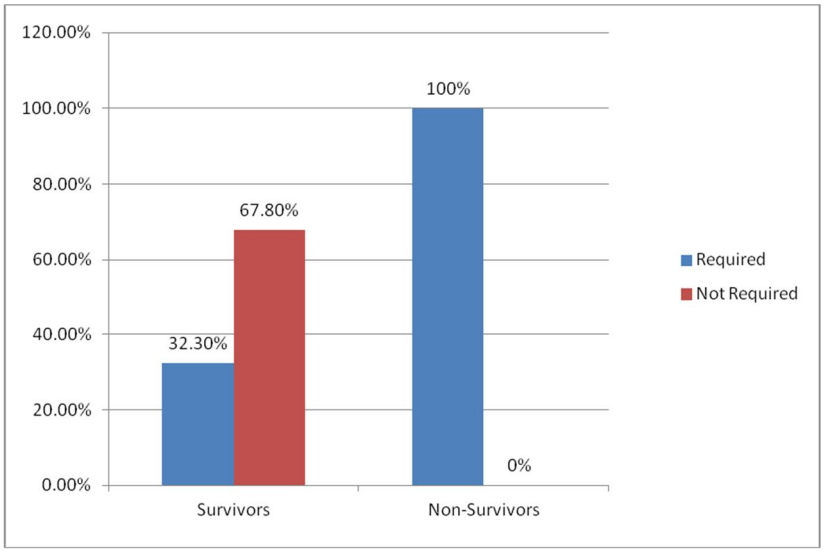

Figure 17: Requirement of ventilation among survivors and non-survivors

16. Lab Parameters:

Investigations done for all the 100 children is shown in the following Table (32):

Table 32 : Lab parameters

S.No	Parameter	Mean ± Std. Deviation
1	CBG	156.68±71.27
2	Ph	7.10±0.326
3	HCO_3	15.20±4.94
4	pCO_2	31.93±8.8
5	Na^+	136.99±7.56
6	K^+	3.73±0.64

Each of the parameters shown in the above table (32) have been compared among the survivors and non survivors and is shown in the following tables:

Table 33 : Mean CBG among survivors and non-survivors

CBG			
Group	**N**	**Mean±Std. Deviation**	**p Value**
Group 1 (n=59)	59	156.542+70.6246	0.675
Group 2 (n=30)	30	163.5+79.3911	

Table 34: Mean pH among survivors and non-survivors

pH			
Group	**N**	**Mean ± Std. Deviation**	**p Value**
Group 1 (n=47)	47	7.1211+0.32016	0.421
Group 2 (n=26)	26	7.0546+0.36238	

Table 35: Mean HCo3 among survivors and non-survivors

HCO_3			
Group	**N**	**Mean ± Std. Deviation**	**p Value**
Group 1 (n=47)	47	15.319+5.1207	0.529
Group 2 (n=26)	26	14.538+4.9172	

Table 36: Mean pCO2 among survivors and non-survivors

pCO_2			
Group	**N**	**Mean ± Std. Deviation**	**p Value**
Group 1(n=47)	47	31.872+9.2375	0.693
Group 2(n=26)	26	31+8.5276	

Table 37: Mean sodium among survivors and non-survivors

Sodium			
Group	**N**	**Mean ± Std. Deviation**	**p Value**
Group 1(n=59)	59	136.339+6.0675	0.18
Group 2(n=30)	30	138.633+9.9325	

Table 38: Mean potassium among survivors and non-survivors

Potassium			
Group	**N**	**Mean ± Std. Deviation**	**p Value**
Group 1(n=59)	59	3.585+0.4965	0.008
Group 2(n=30)	30	4.067+0.8731	

17. CRP:

The median CRP was 12 mg/dl with 25^{th} and 75^{th} interquartile percentile Of 6 and 24 mg/dl respectively.

18. Total counts:

The median total count was 17700 cells/cu.mm with 25^{th} and 75^{th} interquartile percentile of 7300 and 23000 cells/cu.mm

19. Blood culture:

Table 39: NEC report

S.No	NEC	Frequency/Percentage
1	Positive	3(2.9%)
2	Negative	97(95.1%)

The above table shows that among the 100 children, only three of them had growth in the blood culture out of which two where klebsiella and one was staphylococcus aureus.

20. ECHO:

Table 40: ECHO findings

S.No	ECHO	Frequency/Percentage
1	LV normal	60(58.8%)
2	LV dysfunction	9(8.8%)
3	Pulmonary Hypertension	1(1%)
4	Not done	30(29.4%)

Among the 100 children, 60 (58.8%) had a normal LV functioning, 9 (8.8%) had LV dysfunctioning, 1 (1%) had pulmonary hypertension and was not done for 30 (29.4%) children. This data is shown in the above table (40).

21. Duration of shock:

The median duration of shock was 3 hours with 25^{th} and 75^{th} interquartile percentile of 2 hours and 24 hours respectively.

22. Duration of stay in ICU:

The median duration of stay in ICU is 69 hours with 25^{th} and 75^{th} interquartile percentile of 36.5 and 99.5 hours respectively.

23. Etiology:

Table 41 : Etiology of sepsis

S.No	Etiology	Frequency/Percentage
1	Hypovolemia	20
2	Sepsis	57
3	Cardiogenic	20
4	Anaphylactic	3

The above table (41) shows that among the 100 children, cause for shock was found to be sepsis in 57 children, Hypovolemia in 20 children , cardiogenic in 20 children and anaphylactic in 3 children.

The same was compared among survivors and non-survivors and is shown in the following table (42) and picture (18) :

Table 42 : Etiology of shock among survivors and non-survivors

Etiology	Group1 (n=59) (n%)	Group2 (n=30) (n%)	Total	p Value
Hypovolemia	15(25.4%)	3(10%)	18	0.46
Sepsis	30(50.8%)	20(66.7%)	50	
Cardiogenic	11(18.6%)	7(23.3%)	18	
Anaphylactic	3(5.1%)	0	3	
Total			89	

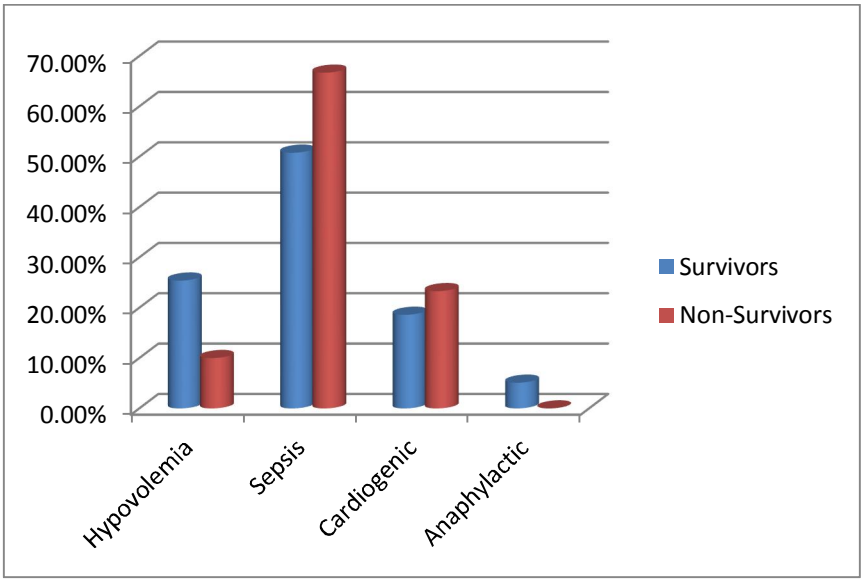

Figure 18 : Etiology of shock among survivors and non-survivors

24. Complications:

Table 43 : Complications

S.No	Complications	Frequency/Percentage
1	MODS	9(6.9%)
2	Renal failure	7(6.9%)
3	DIVC	1(1%)
4	ARDS	1(1%)
5	Coagulopathy	3(2.9%)
6	Myocarditis	2(2%)
7	Hypokalemia	4(3.9%)
8	None	73(72.5%)

The above table (43) explains that among the 100 children, 9 children developed MODS, 7 had renal failure; ARDS and DIVC were found in one child each, 3children had coagulopathy, two had myocarditis and 4 had hypokalemia. The same has been depicted in the following picture (19):

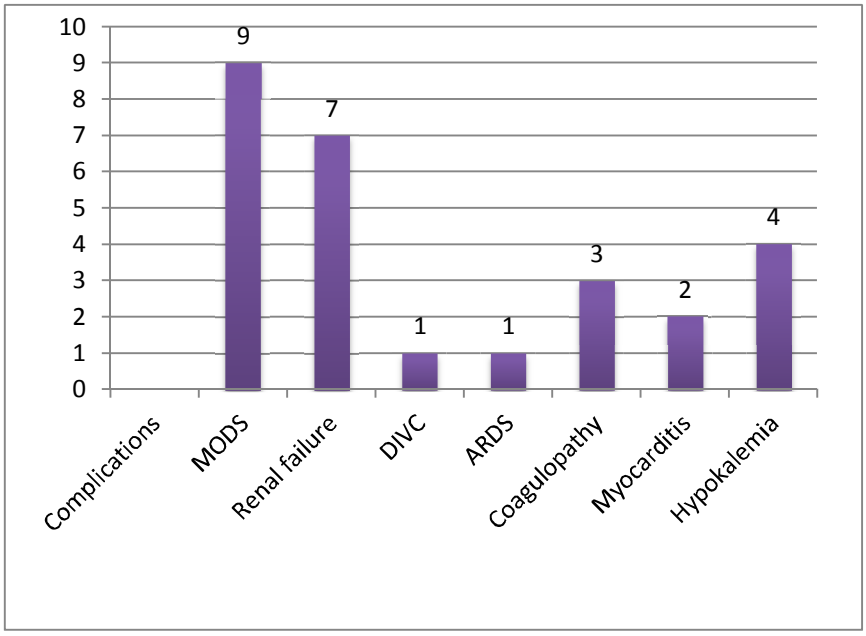

Figure 19: Complications

25. Outcome:

Outcome of the study group were classified into discharged, referral and death and is shown in the following table (44)

Table 44: Outcome among 100 children

S.No	Outcome	Frequency/Percentage
1	Discharged	59(57.8%)
2	Referred	11(10.8%)
3	Death	30(29.4%)

Among 100 children who got admitted with shock, 59 have improved and got discharged, 30 children died and 11 children were referred out. Further details of 11 children who got referred out are not known. Hence they were not included in the comparison groups. All the parameters were compared between survivors and non-survivors only.

Factors associated with mortality in shock were analysed

Table 45: Univariate analysis of the parameters for mortality in shock:

Variables	**Death n = 30**	**Discharge n = 59**	**Total N=89**	**Unadjusted OR (95%CI)**	**p value**
Gender					
Male	15 (32.6)	31 (67.4)	46	1	0.820
Female	15 (34.9)	28 (65.1)	43	1.10 (0.46 – 2.67)	
Symptom					
Less than two symptom	8 (32.0)	17 (68.0)	25	1	0.831
> than two symptom	22 (34.4)	42 (65.6)	64	1.11 (0.41 – 2.98)	
Onset of Illness*					
< 96 hours	18 (25.0)	54 (75.0)	72	1	**0.001**
> 96 hours	12 (70.6)	5 (29.4)	17	7.2 (2.23 – 23.24)	
Prehospital therapy*					
Yes	8 (20.5)	31 (79.5)	39	1	**0.020**
No	22 (44.0)	28 (56.0)	50	3.04 (1.17 - 7.93)	
Duration of Shock*					
< 72 hours	16 (21.6)	58 (78.4)	74	1	**0.001**
> 72 hours	14 (93.3)	1 (6.7)	15	50.75 (6.19 - 415.6)	

Fluid Bolus					
< 40 ml / kg	14 (31.8)	30 (68.2)	44	1	0.709
> 40 ml / kg	16 (35.6)	29 (64.4)	45	1.18 (0.49 – 2.85)	
ICU stay*					
< 96 hours	12 (17.6)	56 (82.4)	68	1	**0.001**
> 96 hours	18 (85.7)	3 (14.3)	21	28 (7.10 - 110.4)	
Total Count*					
< 20000	15 (26.3)	42 (73.7)	57	1	**0.049**
> 20000	15 (46.9)	17 (53.1)	32	2.47 (0.99 - 6.14)	
Sodium					
Normal (135 - 145)	22 (34.4)	42 (65.6)	64	1	
Low (< 135)	6 (27.3)	16 (72.7)	22	0.71 (0.24 - 2.09)	0.539
High (> 145)	2 (66.7)	1 (33.3)	3	3.82 (0.33 - 44.47)	0.332
Potassium					
Normal (3.5 - 4.5)	21 (32.8)	43 (67.2)	64	1	
Low (< 3.5)	2 (11.8)	15 (88.2)	17	0.27 (0.06 - 1.31)	0.043
High (> 4.5)*	7 (87.5)	1 (12.5)	8	14.33 (1.65, 124.2)	**0.002**

Etiology of shock					
Others	10 (25.7)	29 (74.3)	39	1	0.155
Sepsis	20 (40.0)	30 (60.0)	50	1.93 (0.77 - 4.83)	
Number of Inotropes required*					
one	4 (11.4)	31 (88.6)	35	1	
More than one	26 (48.1)	28 (51.9)	54	7.19 (2.23 - 23.19)	**0.001**

Values in parenthesis are percentage, *p value <0.05

Table 46: Multivariate Analysis

Variables	**Total N=89**	**Death n = 30**	**Discharge n = 59**	**Unadjusted OR (95%CI)**	**Adjusted OR (95% CI)**	**p value**
Onset of Duration of Illness						
< 96 hours	72	18 (25.0)	54 (75.0)	1	1	
> 96 hours	17	12 (70.6)	5 (29.4)	7.2 (2.23 – 23.24)	0.47 (0.68 – 3.23)	0.441
Prehospital therapy						
Yes	39	8 (20.5)	31 (79.5)	1	1	
No	50	22 (44.0)	28 (56.0)	3.04 (1.17 - 7.93)	2.00 (0.44 – 9.05)	0.367
Duration of Shock						
< 72 hours	74	16 (21.6)	58 (78.4)	1	1	
> 72 hours	15	14 (93.3)	1 (6.7)	50.75 (6.19 - 415.6)	20.47 (0.54 – 773.05)	0.103

ICU stay*						
< 96 hours	68	12 (17.6)	56 (82.4)	1	1	
> 96 hours	21	18 (85.7)	3 (14.3)	28 (7.10 - 110.4)	8.46 (1.22 – 58.59)	**0.030**
Potassium						
Normal (3.5 - 4.5)	64	21 (32.8)	43 (67.2)	1	1	
Low (< 3.5)	17	2 (11.8)	15 (88.2)	0.27 (0.06 - 1.31)	0.58 (0.04 – 0.839)	0.370
High (> 4.5)	8	7 (87.5)	1 (12.5)	14.33 (1.65, 124.2)	5.90 (0.29 – 118.66)	0.246
Number of Inotropes required*						
Less than 1	35	4 (11.4)	31 (88.6)	1	1	
More than 1	54	26 (48.1)	28 (51.9)	7.19 (2.23 - 23.19)	4.56 (1.10 – 20.82)	**0.049**

Values in parenthesis are percentage, *p value <0.05

DISCUSSION

Shock is one of the most common emergencies in paediatrics. In this study, the etiology, clinical profile and outcome of shock is discussed. The median age group was 24 months with 25th and 75th interquartile percentile being 5 and 69 months respectively. Majority of children, around 75% were in the age group of >1 month to 5 years. Ravikant M et al and Arigela Vasundhara et al also had majority of children in the age group of >1 month to 5 years. In this study, the male : female ratio was found to be 1.4:1. Daljit Singh et al stated male : female ratio in their study as 1.6 : 1. However there was no effect of sex over the outcome. Ravikant M et al also concluded the same.

A total of 100 children with shock were included in the study. Fever is the most common presenting symptom (61.8%) in this study followed by vomiting (57.8%) and convulsions (50%). Kurade A et al also had fever as the commonest presenting symptom. The median duration of onset of illness was 72 hours with 25th and 75th interquartile percentile being 24 hours and 96 hours. When the same was compared among survivors and non-survivors, it was noted that risk of mortality was more among children who got admitted beyond 96 hours of onset of illness when compared to those who got admitted within 96 hours. The mean heart rate among the survivors and non survivors was 165.254 $\pm$ 26.49 and 152.367 $\pm$ 49.96 respectively in this study. Ravikant M et al mentioned the mean heart rate among survivors and non survivors as

164.87 ± 20.71 and 156.59 ± 28.87 respectively. In this study, the mean respiratory rate was 45.3 ± 24.81, mean temperature was 101.10 ± 2.81, mean systolic blood pressure was 80.92 ± 16.4 and the mean pulse pressure was 35.55 ± 10.38.

In this study, shock due to sepsis was the commonest cause (57%), followed by the hypovolemic shock (20%), cardiogenic shock (20%) and anaphylactic shock (3%). Mortality was also highest among septic shock (66.7%) followed by the cardiogenic shock (23.3%). And the least mortality was found in anaphylactic shock followed by hypovolemic shock. Three children got admitted with anaphylactic shock and all the three survived. Ravikant et al in their study also mentioned that septic shock was the commonest (48%) followed by hypovolemic shock (28%) and cardiogenic shock (23%).; the highest mortality in their study was noted among septic shock children (65.5%) followed by cardiogenic shock (31%) and least mortality was found among hypovolemic and anaphylactic. In contrast to other studies like Daljit et al have documented that hypovolemic shock is the commonest in their study followed by septic, cardiogenic and anaphylactic shock and the survival was better in hypovolemic shock. Arigela Vasundhara et al had mentioned that out of 75 children with shock, 69.33% were septic shock, 25.33% were hypovolemic shock, 2.66% were cardiogenic and 2.66% were distributive. Kurade A et al have identified septic shock to be the commonest in their study (56.3%). Jay D. Fisher et al also concluded that

septic shock was the commonest (57%) followed hypovolemic shock (24%), distributive shock (14%) and cardiogenic shock (5%).

The severity of shock at the time of admission was classified as compensated and decompensated. In this study 87 children got admitted with compensated shock and 13 children with decompensated shock. Among the children with hypovolemic shock who presented in decompensated state 84.6% survived and 15.38% have expired. In contrast to a study done by Daljit Singh et al, where number of children with compensated shock was 59 and those with decompensated shock were 39 in number out of 98 children. They have also reported the number of children with compensated and decompensated shock in each type of shock namely hypovolemic, septic, cardiogenic and distributive. The survival rate of hypovolemic shock with decompensated state in that study is 97.7%.

In this study, fluid bolus of <40 ml/kg was required for 51 children, 40 to 80 ml/kg was required for 48 children among whom 49.2% have survived and > 80 ml/kg was required for only one child who did not survive. Manasaranjan Upadhyay et al did a study on fluid boluses with crystalloid Vs colloid and concluded that normal saline and gelatine polymer solutions were equally efficacious; Normal saline upto 110 ml/kg and gelatine upto 70 ml/kg were required for successful resuscitation in the first hour. Miriam Santchi et al in a study stated that 58% of the centres would prefer use of inotropes after

40 to 60 ml/kg of fluids. Nathan Ford et al said that fluid boluses were harmful when compared to no bolus

In this study, inotrope was required for about 68.6% children and ventilator support was required for 56.9% children. According to this study, the need for inotropes and ventilatory support were a significant risk factors for mortality. Arigela et al concluded in their study saying that need for inotropes and mechanical ventilation indicates poor outcome in shock.

In this study steroid was given for 24 children and none of them improved. Sarah J. Atkinson et al in their study concluded saying that their risk stratified analysis failed to demonstrate any benefit from corticosteroids in paediatric septic shock.

In this study, on analysing the requirement of inotropes, need for more than one inotrope was a significant risk factor for mortality.

With regard to the lab parameters, serum potassium and total counts were significantly elevated among the non survivors group [46]. Three children have demonstrated growth in blood culture out of which two were klebsiella and one was Staphylococcus aureus. Daljit Singh et al, who did a study among 98 shock children also had three positive blood cultures. Kurade A Dhanawade et al, also said that the blood culture yield was very low in their study[47]. This can be explained by use of antibiotics prior to sampling.

In the present study, prolonged need for ventilation and ICU care was significantly associated with mortality. The mean duration of ICU stay among non survivors was 152.50 ± 106.20 hours Monteverde et al in their study said that prolonged need for mechanical ventilation and ICU stay had more complications and mortality was also high for them.

Multi Organ Dysfunction Syndrome (MODS) and renal failure were the common complications seen in 6.9% and 6.7% children respectively followed by coagulopathy (2.9%), ARDS and DIVC seen in 1 case each. Tais da Costa Sao Pedro et al said that MODS was seen in 4.3 % cases followed by renal failure and abscesses in 3.5 %. They have concluded that the presence of complications was a factor associated with death.

In this study, 59 children have survived, 30 children expired and 11 were referred out. The overall mortality was 33.7%[48]

On analysing the risk factors for mortality of children with shock certain parameters like prolonged duration of illness (>96 hours), prolonged ICU stay (>96 hours), prolonged duration of shock (>72 hours), high potassium levels (>4.5) and requirement of more than one inotrope were found to be significant by univariate analysis [49.] When these parameters were subjected to multivariate analysis, prolonged ICU stay of > 96 hours and requirement of more than one inotrope were found to be significant risk factors for mortality[50-53].

Limitations in the study :

Central venous pressure monitoring (CVP) and bedside ECHO would have thrown some light towards the monitoring and management of the children with shock.

SUMMARY

In this study, the etiology, clinical profile and outcome of 100 children with shock was analysed. The median age group in this study was 24 months with 25th and 75th interquartile percentile of 5 and 69 months respectively. Majority of children were in the age group of > 1 month to 5 years. Fever was the most common presenting symptom followed by vomiting and convulsions. The median duration of prehospital illness was prolonged among the non survivors when compared with the survivors. Septic shock was the commonest type of shock followed by hypovolemic, cardiogenic and anaphylactic shock. Highest mortality was seen in septic shock followed by cardiogenic shock. Out of the 100 children, 87 children presented with compensated shock and 13 presented with decompensate shock. Requirement of inotrope was high among non survivors when compared to survivors. Requirement of more than one inotrope and prolonged ICU stay of > 96 hours were found to be significant risk factors for mortality on multivariate analysis. The overall survival and mortality is 66.2% and 33.7% respectively.

CONCLUSION

- In the study of 100 children with shock, majority of children were in the age group of > 1 month to 5 years
- Fever was the most common presenting symptom followed by vomiting and convulsions
- Septic shock was the most commonest type (57%), followed by hypovolemic shock (20%), cardiogenic shock (20%) and anaphylactic shock (3%).
- The mortality was highest in septic shock (66.7%) followed by cardiogenic shock (23.3%) and hypovolemic shock (10%).
- On univariate analysis, parameters like prolonged duration of illness (>96 hours), prolonged ICU stay (>96 hours), high serum potassium, requirement of more than one inotrope were found to be significantly associated with mortality.
- Multivariate analysis revealed, requirement of more than one inotrope and ICU stay of > 96 hours to be significantly associated with mortality.

Recommendation :

According to this study, prolonged pre hospital illness and lack of pre hospital stabilisation were significantly associated with mortality.

Hence in order to reduce mortality, it is essential to pick up children with shock earlier and to refer them with initial stabilisation and a good transport care.

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CHENGALPATTU GOVERNMENT MEDICAL COLLEGE AND HOSPITAL DEPARTMENT OF PEDIATRICS

SI No**:** IP NO:

Name: <1 yr 2 – 5 yrs >5 yrs 5-10yrs Age:

Sex: Region:

HISTORY:

	Yes	**No**	**Duration**
Fever			
Convulsions			
Breathlessness			
Rashes			
Vomiting			
Diarrhea			
Obvious focus			

Duration of illness (hrs) :

Pre hospitalization (yes or no) :

Heart rate	
Respiratory rate	
Systolic bp	
Diastolic bp	
Pulse pressure	
CBG	
ABG	

Cardinal signs	yes	no
Temperature		
CRP		
Tachypnoea		
Bradypnoea		
Tachycardia		
Bradycardia		
Wide pulse pressure		
ALOC		
Compensated shock		
Hypotensive shock		

Duration of shock (hrs)	
Fluid bolus (ml/kg)	
Ionotrope (yes or no)	
Type of ionotrope	
Steroid (yes or no)	

Investigations	**Elevated**	**Decreased**	**Normal**
total count			
Hb			
Hematocrit			
MP SMEAR			
urine routine			
urine c/s			
CRP			
NEC			

Sodium			
Potassium			

	Increased	**Decreased**	**Normal**
SGOT			
SGPT			
s.bilirubin			
Urea			
Creatinine			

Tranfusion	yes	no
platelets		
FFP		
PRBC		

- HOSPITAL STAY:
- DURATION OF FEVER:
- COMPLICATION
- VENTILATORY SUPPORT:
- INOTROPE SUPPORT:
- FINAL OUTCOME:

FINAL DIAGNOSIS :

PATIENT CONSENT FORM

STUDY DETAIL:

"CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL"

STUDY CENTER:

CHENGALPATTU MEDICAL COLLEGE & HOSPITAL, C HENGALPATTU

PATIENT NAME: PATIENT AGE:

IDENTIFICATION NUMBER: FATHER'S NAME:

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I understand that my child participation in the study is voluntary and that I am free to withdraw my child at anytime without giving any reasons, without my legal rights being affected.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if withdraw from the study, I understand that my child identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I agree my child to take part in the above study and to comply with the instructions given during the study and faithfully cooperative with the study team and to immediately inform the study staff if my child suffer from any deterioration in my health or wellbeing or any unexpected or unusual symptoms.

I hereby give consent for my child to participate in this study.

I hereby give permission to undergo complete clinical examination and diagnostic test on my child .

Signature/Thumb impression: Place:

Parent name and address: Date:

Signature of the investigator: Place:

CHILD ASSENT FORM

STUDY DETAIL:

CLINICAL PROFILE ETIOLOGY RISK FACTORS AND OUTCOME OF CHILDREN WITH SHOCK IN PICU IN A TERTIARY CARE HOSPITAL

STUDY CENTER:
CHENGALPATTU MEDICAL COLLEGE & HOSPITAL, CHENGALPATTU

PATIENT NAME: PATIENT IDENTIFICATION NUMBER: AGE:

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction. I understand that my participation in the study is voluntary and that I am free to withdraw at anytime without giving any reasons, without my legal rights being affected.

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I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperative with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or wellbeing or any unexpected or unusual symptoms.

I hereby give consent to participate in this study. I hereby give permission to undergo complete clinical examination and diagnostic test .

Signature/Thumb impression:	Place:
Patient name and address:	Date:
Signature of the investigator:	Place:
Study investigator's name:	Date:

Master Chart

S.No	Age	Gender	Fever	Convulsions	Breathlessness	Rashes	Vomiting	Diarrhea	Obvious focus	Duration	Pre hospitalisa	Pre hosp management	HR	RR	CRT	Sensorium	Temperature	BP	Systolic
1	1.00	2	2	2	2	2	1	1	1	48	2	5	180	68	2	2	99.4	3	60
2	1.80	2	2	2	1	2	1	1	1	96	1	2	190	58	2	4	103	2	72
3	11.00	1	1	1	2	2	2	2	1	48	2	5	190	68	2	2	102	1	74
4	8.00	2	1	1	2	2	1	2	2	96	2	2	178	70	2	4	104	1	72
5	8.00	2	1	1	2	2	1	2	2	24	2	5	182	68	2	4	102	1	78
6	72.00	2	2	2	1	2	1	2	1	4	2	5	150	36	2	2	95	1	100
7	1.50	1	1	2	2	2	2	1	1	48	2	5	183	74	2	3	102	1	70
8	11.00	1	1	1	2	2	2	2	1	15	1	1	176	68	2	2	103	1	70
9	72.00	2	2	2	1	2	2	2	1	4	1	3	162	36	2	2	97	1	84
10	132.00	2	2	2	2	2	2	2	1	1	2	4	101	36	2	2	98	1	96
11	36.00	2	1	2	2	2	1	1	1	24	1	1	184	32	2	3	103	3	66
12	48.00	1	1	2	2	2	1	2	2	72	2	5	163	28	2	3	102	1	80
13	12.00	1	1	2	1	2	2	1	1	96	2	5	173	68	2	2	102	1	74
14	120.00	2	1	2	2	2	1	2	2	48	1	1	143	40	2	2	99	1	94
15	1.50	2	1	2	1	2	2	2	1	168	2	5	170	82	2	3	100	3	52
16	24.00	1	1	1	2	2	2	2	1	168	2	5	126	20	1	3	102.4	1	74
17	15.00	2	2	1	1	2	1	1	1	24	1	1	188	64	2	3	103.4	1	70
18	10.00	2	1	2	1	2	1	2	2	192	2	5	190	20	2	4	104.2	1	70
19	11.00	2	1	2	1	2	1	2	2	360	1	1	188	72	1	2	100.1	1	72
20	6.00	1	1	1	1	2	1	2	1	24	1	1	178	28	3	4	103.4	1	74
21	1.20	2	1	2	2	2	1	1	1	24	2	5	182	74	2	3	104	1	70
22	72.00	2	1	2	2	1	1	2	2	96	1	1	140	28	2	2	100.2	3	70
23	96.00	1	1	2	2	1	1	2	2	96	1	1	142	24	2	2	98.4	3	72
24	48.00	2	1	2	2	2	1	2	2	72	1	1	156	28	2	2	98.5	1	80

S.No	Age	Gender	Fever	Convulsions	Breathlessness	Rashes	Vomiting	Diarrhea	Obvious focus	Duration	Pre hospitalisa	Pre hosp management	HR	RR	CRT	Sensorium	Temperature	BP	Systolic
25	60.00	1	1	1	2	2	1	2	1	96	2	5	155	48	1	4	101.4	1	84
26	10.00	2	2	1	1	2	2	2	2	24	2	5	168	30	2	4	100	1	72
27	5.00	2	2	2	1	2	1	2	2	48	1	2	202	92	2	4	100.1	1	70
28	96.00	1	1	2	1	2	2	2	2	72	2	5	158	48	1	1	100.2	1	90
29	1.60	1	1	2	1	2	1	1	1	48	1	1	206	72	2	3	104.2	1	70
30	132.00	1	2	2	1	1	2	1	1	1	1	2	153	48	2	3	98	1	100
31	84.00	2	2	2	1	2	1	2	1	4	1	1	132	40	2	2	95	1	100
32	60.00	2	1	2	2	2	1	1	2	100	1	1	170	48	2	4	104	1	84
33	72.00	2	2	2	2	2	2	2	1	168	2	5	68	28	1	1	98.6	1	84
34	10.00	1	2	1	1	2	2	2	1	3	2	5	183	24	2	4	102	1	74
35	12.00	1	2	1	2	2	1	2	1	72	2	5	54	10	2	4	100.3	2	130
36	12.00	2	1	2	2	2	1	1	1	48	1	5	170	72	2	3	98.4	1	74
37	2.00	1	2	1	2	2	2	2	1	24	1	1	46	24	2	4	100.2	2	126
38	1.50	1	2	1	2	2	2	2	2	24	2	5	132	48	1	1	99	1	67
39	84.00	1	1	2	1	1	2	2	1	480	2	5	134	32	1	1	103	1	86
40	11.00	2	1	2	1	2	2	2	1	168	2	5	190	68	1	1	104.2	1	70
41	72.00	2	1	2	2	2	1	2	1	72	2	5	180	48	2	3	105	1	86
42	36.00	1	1	1	2	2	2	2	2	168	2	5	150	44	2	3	104.4	1	80
43	6.00	2	1	2	1	2	1	1	1	48	2	5	208	70	2	4	103.3	1	67
44	24.00	1	2	2	2	2	2	1	2	2160	2	5	168	40	1	2	98	2	120
45	36.00	2	1	1	2	2	1	2	1	6	2	5	40	0	2	4	95	3	60
46	4.00	2	1	2	1	1	2	2	2	72	2	5	187	72	2	2	103.6	1	70
47	144.00	2	1	2	2	1	1	2	2	96	1	5	130	24	2	1	100.2	1	100
48	72.00	1	1	2	2	1	1	2	1	120	2	5	128	28	2	2	100.3	1	100
49	6.00	2	1	2	1	2	2	1	1	48	2	5	211	70	2	4	104.2	3	50
50	120.00	1	2	2	2	1	1	2	1	96	1	1	120	28	1	1	98.6	1	90

S.No	Age	Gender	Fever	Convulsions	Breathlessness	Rashes	Vomiting	Diarrhea	Obvious focus	Duration	Pre hospitalisa	Pre hosp management	HR	RR	CRT	Sensorium	Temperature	BP	Systolic
51	36.00	2	1	1	2	2	1	2	1	24	2	5	170	0	2	4	104.2	1	80
52	24.00	2	2	2	2	2	2	1	1	72	2	5	180	52	2	3	99	3	60
53	36.00	2	2	2	2	2	1	2	1	6	1	1	150	44	2	2	95	1	80
54	1.10	1	1	1	1	1	2	2	2	96	2	5	192	74	3	2	103.4	1	70
55	10.00	1	1	1	2	2	1	2	2	108	2	5	180	42	2	4	103	1	80
56	132.00	2	1	2	2	1	1	2	1	96	2	5	120	28	2	1	98	1	96
57	11.00	1	2	1	1	2	2	2	2	3	2	5	163	68	2	4	99	1	76
58	1.70	2	2	1	2	2	1	2	1	72	2	5	53	0	2	4	100	2	130
59	3.00	1	1	1	2	2	1	2	2	96	2	5	183	74	2	2	103.4	1	70
60	72.00	2	1	2	2	2	2	2	1	72	2	5	180	40	2	2	104	1	86
61	120.00	2	1	2	2	2	1	2	1	96	2	5	120	28	1	1	100	1	90
62	36.00	1	2	2	2	2	2	1	1	48	1	5	170	44	2	3	100	3	70
63	30.00	2	2	2	2	2	2	1	1	72	2	5	192	70	2	4	95	3	62
64	36.00	2	1	1	2	2	1	2	1	4	1	1	173	74	2	4	104	1	74
65	3.00	1	1	2	1	2	1	2	1	168	1	2	175	78	2	2	103.4	1	70
66	5.00	1	1	2	1	2	2	2	2	96	1	2	170	84	2	2	98.3	1	84
67	108.00	2	2	2	2	2	1	2	1	4	1	3	130	28	1	2	99.4	1	100
68	84.00	1	2	2	2	2	2	2	1	3	1	3	140	24	1	3	99	1	100
69	96.00	1	1	1	2	2	1	2	2	72	2	5	182	0	2	4	104.4	1	96
70	120.00	1	2	2	1	2	1	2	1	4	1	4	150	48	2	2	95	2	128
71	4.00	2	1	1	2	2	1	2	2	10	2	5	170	0	2	4	103.2	1	74
72	36.00	1	1	2	2	2	1	2	2	168	2	5	174	40	2	2	104.6	1	78
73	3.00	1	2	2	1	2	2	1	1	72	1	1	180	74	2	3	102	1	70
74	1.30	2	1	2	1	2	1	2	1	96	1	2	180	68	2	3	103	1	70
75	2.00	2	1	1	1	2	1	2	2	24	2	5	178	0	2	4	103.4	1	70
76	60.00	1	1	2	1	2	1	2	2	168	2	5	170	40	2	3	102.3	1	80

S.No	Age	Gender	Fever	Convulsions	Breathlessness	Rashes	Vomiting	Diarrhea	Obvious focus	Duration	Pre hospitalisa	Pre hosp management	HR	RR	CRT	Sensorium	Temperature	BP	Systolic
77	12.00	2	1	2	1	2	1	2	1	168	1	1	182	64	1	2	103.5	1	70
78	120.00	1	1	2	1	2	2	2	1	144	2	5	162	44	1	2	104.5	1	100
79	10.00	2	2	1	2	2	2	2	1	5	2	5	193	0	2	4	105	1	70
80	108.00	1	1	2	2	1	1	2	2	120	1	1	158	44	2	2	100	3	80
81	1.50	1	2	1	2	2	2	2	1	48	2	5	178	52	1	1	98.6	1	66
82	3.00	1	2	1	2	2	1	2	1	72	2	5	68	0	2	4	100.3	3	128
83	18.00	1	2	1	2	2	2	2	1	3	1	1	170	0	2	4	98.6	1	90
84	24.00	1	1	1	2	2	2	2	1	48	2	5	183	0	2	4	104.5	1	76
85	24.00	1	1	2	2	2	1	1	1	168	2	5	171	32	1	3	102.4	1	74
86	24.00	2	1	2	1	2	2	2	1	168	2	5	178	68	2	2	103.4	1	70
87	1.50	1	2	2	1	2	1	1	1	72	1	1	180	78	2	3	104	1	66
88	24.00	2	2	2	1	2	1	2	1	3	1	4	156	68	2	2	97	1	80
89	36.00	1	1	1	2	2	2	1	1	48	1	1	170	48	2	3	103.4	2	100
90	1.20	2	1	2	1	2	2	2	1	96	1	2	180	76	2	3	104	1	80
91	12.00	1	2	2	2	2	1	1	1	48	1	1	178	56	2	4	96	3	50
92	24.00	1	1	2	1	2	2	2	1	72	2	5	200	52	2	2	104.3	1	90
93	4.00	1	1	2	1	1	1	2	1	168	2	5	204	74	2	2	104.2	1	80
94	2.50	1	2	2	1	2	2	2	1	48	2	5	183	84	2	2	98	1	76
95	60.00	2	1	2	2	1	1	2	1	96	1	1	120	24	2	2	100.3	1	80
96	36.00	2	2	2	1	2	1	2	1	3	1	1	140	32	2	2	96	2	100
97	30.00	2	2	2	1	2	1	2	1	2	2	5	172	68	1	3	100.2	1	80
98	36.00	2	1	1	1	2	2	2	1	48	2	5	170	0	2	4	104.4	1	80
99	72.00	1	2	2	2	2	1	2	1	2	1	3	150	24	1	1	100.2	1	84
100	1.70	1	1	2	2	2	1	1	1	48	1	1	203	74	2	3	104.3	1	80

Master Chart

S. No	Diastolic	PP	CBG	Duration of shock	Fluid Bolus	Ionotrope	Type of ionotrope	Steroid	ECHO	Ventilation	ICU stay	CRP	TC	NEC	Na	k	Etiology	Type of sh	Outcome	No of inotropes
1			280	1	2	2	5	3	4	2	33	12	17000	2	135	3.8	1	1	1	4
2	30	42	240	1.5	2	2	5	3	4	1	96	24	24000	2	134	2.2	2	4	1	4
3	30	44	340	2	2	1	1	3	4	2	72	24	22000	1	142	4.2	2	4	1	1
4	40	32	52	2.5	1	1	1	3	4	1	96	24	18000	2	137	3.4	2	4	1	1
5	20	58	270	1.5	2	1	3	3	1	1	288	12	21000	2	166	4.2	2	4	3	3
6	64	36	178	1	1	1	2	3	1	2	40	6	6000	2	133	3.6	3	3	1	1
7	30	40	132	0.6	2	2	5	3	4	2	72	24	19000	2	136	3.7	2	4	1	4
8	40	30	170	2	2	1	1	3	4	2	96	6	8000	2	140	4.2	2	4	1	1
9	50	34	180	2	1	1	2	3	1	2	100	12	10000	2	138	3.9	3	3	1	1
10	60	36	120	3	1	1	2	3	2	2	120	6	9000	2	140	3.8	3	3	1	1
11	30	36	102	5	2	1	1	3	4	2	96	24	4400	2	126	3.5	1	1	1	1
12	40	40	103	48	2	1	3	3	1	1	96	24	8000	2	141	3.9	2	4	3	2
13	30	44	192	1	2	2	5	3	1	2	72	6	13000	2	122	3.1	2	4	1	4
14	40	54	99	1	2	2	5	3	1	2	96	6	4200	2	130	3	2	4	1	4
15	30	22	190	16	1	1	2	3	2	1	24	12	15000	2	126	5.2	3	3	3	2
16	40	34	85	160	1	1	3	2	1	1	264	6	9800	2	121	3.6	2	4	3	3
17	40	30	177	24	2	1	3	3	4	1	96	12	19000	2	138	3.7	2	4	3	2
18	20	50	203	48	2	1	4	3	1	1	312	24	32000	1	141	4.3	2	4	3	3
19	46	26	88	90	1	1	3	2	1	1	168	6	11000	2	143	4.5	2	4	3	2
20	20	54	223	60	2	1	4	3	1	1	72	12	29000	2	121	5.8	2	4	3	2
21	30	40	181	1.5	2	2	5	3	1	2	24	24	30000	2	135	3.1	2	4	1	4
22	50	20	94	1	1	2	5	3	1	2	48	6	3200	2	122	3.9	1	1	1	4
23	54	18	110	1	1	2	5	3	1	2	48	6	2800	2	127	4.6	1	1	1	4
24	64	16	129	1	1	2	5	3	4	2	48	6	4200	2	125	3.4	1	1	1	4
25	40	44	174	96	1	1	3	2	1	1	336	24	23300	1	138	5.2	2	4	3	3

S. No	Diastolic	PP	CBG	Duration of shock	Fluid Bolus	Ionotrope	Type of ionotrope	Steroid	ECHO	Ventilatio	ICU stay	CRP	TC	NEC	Na	k	Etiology	Type of sh	Outcome	No of inotropes
26	40	32	320	1	1	2	5	3	1	2	24	6	6400	2	137	3.9	3	3	1	4
27	40	30	108	10	1	1	2	3	2	1	12	12	18000	2	138	3.6	3	3	3	1
28	60	30	94	96	2	1	3	2	1	1	288	12	21000	2	140	3.6	2	4	3	2
29	20	50	203	24	2	1	4	3	1	1	36	24	30000	2	138	3.8	2	4	3	2
30	60	40	154	0.5	1	2	5	3	2	2	48	6	9100	2	142	3.4	3	3	1	4
31	60	40	102	2	1	1	2	3	2	2	36	6	9400	2	146	3.5	3	3	1	1
32	30	54	95	72	2	1	4	3	1	1	96	24	23000	2	138	6.1	2	4	3	2
33	50	34	87	72	2	1	3	2	1	1	192	6	7400	2	140	3.5	3	3	3	3
34	40	34	270	2	1	1	1	3	4	1	48	6	8300	2	138	3.6	3	3	1	1
35	84	46	352	96	1	1	3	2	1	1	168	12	19200	2	143	2.3	3	3	3	2
36	30	44	98	1.5	2	2	5	2	4	2	36	12	31000	2	144	3.8	2	4	1	4
37	84	42	102	90	1	1	3	2	1	1	192	6	7800	2	138	4.2	1	1	3	3
38	40	27	108	100	1	1	3	2	4	1	192	12	26000	2	142	4.3	3	3	3	2
39	40	46	92	110	2	1	3	2	1	1	168	24	24000	2	143	4.2	2	4	3	2
40	40	30	96	96	2	1	3	2	4	1	336	24	27000	2	142	4.6	2	4	3	3
41	40	46	106	1.5	2	2	5	3	4	2	72	6	24000	2	141	3.8	2	4	1	4
42	30	50	302	74	2	1	4	3	4	1	144	24	28000	2	133	4.6	2	4	3	2
43	10	57	225	3	2	1	4	3	1	1	48	24	31000	2	145	4.5	2	4	1	1
44	86	34	86	10	1	1	3	2	1	1	360	24	32000	2	168	2.2	2	4	3	2
45	?		271	24	2	1	3	2	1	1	36	6	18000	2	134	3.5	2	1	3	2
46	20	50	103	90	1	1	4	3	1	1	192	24	3000	2	135	3.8	2	4	3	3
47	80	20	94	2	1	2	5	3	1	2	48	6	3100	2	144	3.6	1	1	1	4
48	80	20	78	2	1	2	5	3	1	2	36	6	4100	2	130	3.7	1	1	1	4
49	?		274	12	3	1	4	3	4	1	144	24	19000	2	136	3.6	1	1	3	2
50	70	20	98	2	1	2	5	3	1	2	48	6	2600	2	121	3.7	1	1	2	4
51	50	30	183	3	1	1	1	3	1	2	36	12	23000	2	136	4.3	2	4	1	1

S. No	Diastolic	PP	CBG	Duration of shock	Fluid Bolus	Ionotrope	Type of ionotrope	Steroid	ECHO	Ventilatio	ICU stay	CRP	TC	NEC	Na	k	Etiology	Type of sh	Outcome	No of inotropes
52	?		106	3	2	2	5	3	1	2	36	6	6400	2	140	2	1	1	1	4
53	50	30	102	0.5	1	2	5	3	1	2	48	6	7300	2	135	4.1	3	3	1	4
54	20	50	87	4	2	1	4	3	1	1	216	24	3000	2	137	3.8	2	4	1	1
55	50	30	257	24	1	1	3	2	1	1	48	24	29000	2	138	3.6	2	4	3	2
56	78	18	88	2	1	2	5	3	1	2	36	6	4500	2	128	4.1	1	1	1	4
57	50	26	189	3	1	1	1	3	1	1	48	6	6500	2	139	3.4	2	4	1	1
58	90	40	220	24	1	1	3	2	4	1	24	6	14000	2	140	3.9	1	1	3	1
59	30	40	188	48	2	1	3	2	4	1	58	12	21000	2	136	3.5	2	4	3	1
60	30	56	190	4	2	1	4	3	1	2	72	24	5000	2	137	3.8	2	4	1	1
61	70	20	76	2	1	2	5	3	1	2	32	6	3300	2	123	3.9	1	1	2	4
62	30	40	99	2	2	2	5	3	4	2	46	6	6600	2	133	3.5	1	1	1	4
63	?		44	1	2	2	5	3	4	2	72	6	7300	2	140	2.1	1	1	1	4
64	30	44	232	3	1	1	1	3	1	2	40	24	24000	2	137	4.3	2	4	1	1
65	30	40	111	4	1	1	4	3	1	1	48	24	19000	2	133	3.6	2	4	1	1
66	56	28	94	4	1	1	2	3	3	1	96	6	8300	2	143	3.6	3	3	2	1
67	60	40	98	1	1	2	5	3	1	1	60	6	7200	2	134	3.1	5	4	1	4
68	60	40	231	1	2	2	5	3	1	1	68	6	8200	2	138	4.1	5	4	1	4
69	60	36	188	3	1	1	1	3	1	2	96	12	21000	2	136	3.5	2	4	1	1
70	70	58	192	3	1	1	2	3	2	1	64	6	6300	2	139	3.6	3	3	1	1
71	54	20	190	5	1	1	4	3	1	1	168	12	21000	2	138	3.5	2	4	2	2
72	50	28	312	2	2	2	5	3	1	2	36	24	4400	2	137	3.5	2	4	1	4
73	40	30	178	4	2	1	1	3	1	2	40	24	23000	2	137	3.1	2	4	1	1
74	50	20	200	3	2	1	4	3	1	1	80	24	20000	2	142	3.6	2	4	1	1
75	30	40	220	2	2	1	4	2	1	1	216	24	20000	2	143	3.8	2	4	2	2
76	40	40	180	100	2	1	1	2	4	1	192	24	24500	2	138	3.6	2	4	2	2
77	40	30	102	100	2	1	3	2	1	1	312	24	21800	2	139	3.5	2	4	2	2

S. No	Diastolic	PP	CBG	Duration of shock	Fluid Bolus	Ionotrope	Type of ionotrope	Steroid	ECHO	Ventilatio	ICU stay	CRP	TC	NEC	Na	k	Etiology	Type of sh	Outcome	No of inotropes
78	60	40	100	94	2	1	3	2	1	1	214	24	18000	2	137	3.6	2	4	2	3
79	44	34	192	90	2	1	3	2	1	1	96	6	19200	2	144	3.1	2	4	1	1
80	60	20	95	2	1	2	5	3	4	2	36	6	3200	2	122	3.7	1	1	1	4
81	40	26	106	72	1	1	3	3	4	1	120	6	17000	2	142	3.2	2	4	2	2
82	86	42	88	2	1	1	3	3	1	1	96	12	17300	2	145	3.8	1	1	1	1
83	60	30	78	3	1	1	1	3	4	1	36	6	7300	2	138	3.6	3	3	1	1
84	50	26	178	3	1	1	1	3	4	1	24	24	23200	2	137	3.5	2	4	1	1
85	50	24	182	84	2	1	3	2	4	1	98	12	17800	2	122	5.5	2	4	3	2
86	50	20	177	11	1	1	3	2	1	1	24	24	23200	2	136	3.6	2	4	2	2
87	36	30	284	3	2	1	1	3	4	2	48	24	26000	2	138	3.5	2	4	1	1
88	40	40	75	70	1	1	2	3	2	1	97	12	17600	2	142	3.6	3	3	3	2
89	60	40	43	3	1	1	1	3	4	2	32	6	21000	2	144	3.7	2	4	1	1
90	50	30	183	4	2	1	1	3	1	2	40	24	24000	2	143	3.5	2	4	1	1
91	?		199	1.5	2	2	5	3	1	2	35	12	6300	2	142	3	1	1	1	4
92	60	30	178	1	2	2	5	3	1	2	72	24	23000	2	135	3.5	2	4	1	4
93	40	40	191	4	2	1	4	3	1	1	90	12	26300	2	126	3.4	2	4	1	1
94	40	36	184	2	1	1	2	3	2	1	16	6	7300	2	136	3.6	3	3	2	1
95	60	20	84	2	1	2	5	3	1	2	32	6	3800	2	127	3.5	1	1	1	4
96	60	40	103	2	1	1	2	3	2	1	24	6	12000	2	139	3.5	3	3	1	1
97	50	30	97	20	1	1	3	2	4	1	38	1	21000	2	138	3.6	3	3	3	1
98	50	30	182	3	1	1	1	3	1	2	48	2	18300	2	137	4.2	2	4	1	1
99	40	44	104	1	2	2	5	3	1	1	52	1	7300	2	138	3.5	5	4	1	4
100	40	40	178	4	2	1	4	3	4	1	70	3	26300	2	142	3.8	2	4	1	1